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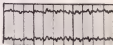


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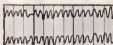
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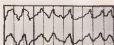
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Editor: JOHN W. CAMPBELL, JR.

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COVER BY EMSh • Illustrations by Emsh, Freas and van Dongen

SYMBOL: Statistical Anomaly

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Astounding SCIENCE FICTION published monthly by Street & Smith Publications, Incorporated at 575 Madison Avenue, New York 22, N. Y. Arthur Z. Gray, President; Ralph B. Whittaker, Jr., Executive Vice-President; Arthur P. Lawler, Vice-President and Secretary; Robert E. Park, Vice-President and Advertising Director; Thomas H. Kaiser, Treasurer. © 1957 by Street & Smith Publications, Inc., in the United States and countries signatory to the Berne Convention and Pan American Convention. Entered as second-class matter at the Post Office, New York, N. Y. Subscription \$3.50 for one year and \$6.00 for two years in the United States, Possessions and Canada; \$1.75 for one year and \$3.00 for two years in Pan American Union, Philippine Islands and Spain. Elsewhere \$5.00 for one year and \$8.50 for two years. When possible allow four weeks for change of address. Give old address and new address when notifying us. We cannot accept responsibility for unsolicited manuscripts or art work. Any material submitted must include return postage. All subscriptions should be addressed to Subscription Dept., Street & Smith Publications, Incorporated, 304 East 45th Street, New York 17, New York.

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BUT... I MEASURED IT!

I hear tell that the AEC had trouble on one of the "nuclear devices" tests. It seems the count-down went according to schedule, and the zero-time came, the button was pushed . . . and the bomb didn't go off. There was, then, some marked degree of confusion. Seconds passed. Minutes passed. They couldn't even look to make sure for themselves that the incredible had happened—that the bomb-shot was a failure—because it *might* pick that instant to make a delayed shoot, which would, of course, mean blindness for anyone actually looking toward the lonely bomb cab stuck up on its tower in the desert.

Time passed; frantic checking of all accessible circuits established that all were in perfect working order. The trouble was in the bomb cab itself.

Someone was going to have to drive out across the empty desert to the tower. Someone was going to have to climb three hundred feet up the spindly tower, and see why it hadn't fired. Somewhere in the

maze of electronic equipment in the cab, something had gone wrong. It might, of course, simply be a slightly sticky relay, just waiting to be shaken loose by the vibration of a man climbing the tower . . .

When those "nuclear devices" are tested, the amount of electronic instrumentation that goes into the cab with the bomb about equals in total cost the bomb itself, and has an active service life a few milliseconds longer than the fissionable material of the bomb. This being the case, they do *not* want the bomb to go off if the recording instruments are not working—so there are safety interlocks, et cetera, cross-connecting all the equipment. The failure could have occurred in any of scores of units, any one of which could, by its failure, halt proceedings.

Eventually, someone did climb that lonely, vibrating tower—and nobody watched him do it, of course—and secured the bomb. Then they began investigating the cause of the failure.

The cause was that an overvoltage

relay had kicked out. Too high voltage on the electronic equipment, which meant that precise timing circuits might be uselessly off beat. They also found the cause of the overvoltage.

Just before the test, a technical crew, with elaborate and special test equipment, had gone over all the equipment, adjusting everything, measuring voltages, currents, timing pulses, everything. When everything was adjusted right on the nose, they'd unplugged their test equipment, hauled it down out of the tower, and departed for safer quarters.

The overvoltage relay had, presumably, kicked out even before they unplugged their test equipment; merely turning off the switches on that test equipment had no doubt lightened the load on the three- or four-mile long power line leading from the power source to the bomb cab to cause the voltage to rise.

Of course the test crew went back to base, satisfied that everything was on the nose. Why, they'd *measured* it all, hadn't they?

Measured *what*? What does a reading on a meter mean? At the General Electric Laboratories in Schenectady, I remember seeing the big, super-size, dominating instrument, square-cased in severe black and white, centered on the control panel of the betatron. In inch-high letters the dial was labeled MEGA-VOLTS, and read from 0 to 300. It didn't, however, measure volts; it measured microamperes, and the

microamperes were generated by a device that sensed the flux-density of the magnetic field of the magnet-coil of the betatron.

If their theory was correct, *and* the magnetic field wasn't locally distorted, *and* the instrument was working properly, *then* there was a correlation of predictable nature between the position of the pointer on the dial, and the energy of the electrons in the betatron. Since those electrons were at no point influenced by an electrostatic field, but were accelerated entirely by magnetic forces, and there was no electrostatic potential involved, there was no megavoltage present. There was a certain kinetic energy of electrons present, which, under certain conditions, might have been converted to electrostatic potential, of course—but the conditions necessary to achieve that conversion of kinetic energy of electrons to electrostatic potential were, in fact, absolutely impossible of achievement.

"But . . . I *measured* it!"

Measured what? And what does the measure mean?

I've had fun demonstrating the series of cockeyed "Laws" of electricity that can be derived from accurately calibrated measuring devices. One of the best is the "Law" that "The more voltage you apply across a resistor, the less power is present."

This requires simple equipment, available in most modern electronics or physics laboratories, even home

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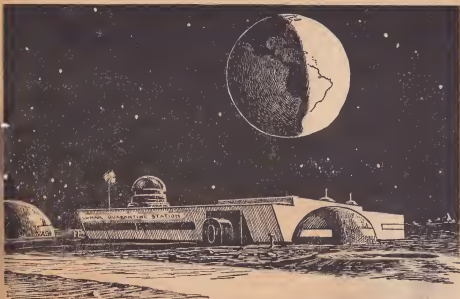


WHAT'S EATING YOU?

It's not enough to pay attention to Truth, to Facts or to Now. But how can you get people who think only in terms of Facts to see that? To see that "mere fantasies" are deadly important....

BY RANDALL GARRETT

Illustrated by Emsh



"The unchanging face of the moon," they called it. In a way, it was. Seen from Earth with the naked eye, it certainly didn't look any different than it had for the past fifty million or so years. But a fairly good-sized telescope would reveal little dots and blotches here and there that represented change. You had to know where to look, but it wasn't too hard to find the dots that represented the buildings erected by Man in his plunge toward the stars.

There were the Atomic Products Plants, for instance; they had solved the problem of atomic waste disposal—moon craters don't mind being dumped full of the stuff, and there's

no air or water to carry it away. There were the big interplanetary spacefields and, on the side of the moon away from Earth, where they would be untroubled by Earthlight, were the two Lunar Observatories.

But, to the public mind, the most mysterious and controversial of all these installations was the Lunar Quarantine Station of the Stellar Exploration and Colonization Administration. It housed men and women who had risked their health, their sanity, and their lives to explore and chart new planets for Mankind—men and women who were now prisoners in solitary confinement. Some of them had not

been near another human being for more than five years.

Alex Zavacki was one of these. It had been four years since he had kissed his fiancée good-by; it had been three years since he had been out of his sealed apartment in the Station.

He, had two years to go.

His first inkling that the so-called average man was more interested in the SEACA Quarantine Station than might normally have been the case came when he was checking over a list of neologisms that had been coined on Purvis, one of the oldest of the nineteen colonized extra-solar planets.

Zavacki was a linguist, and a good one. He had seen that there was a job to be done, and he had sacrificed six years of his life to get it done. In the eight decades that had passed since the first colony had been established, the English language had begun to shoot off in twenty different directions, and Zavacki wanted to check and record the divergences.

His notes were spread on the desk before him. He studied them carefully, occasionally transcribing notes from one sheet to another, cross-checking meanings and pronunciations and derivations, completely oblivious to the comfortable surroundings of his apartment.

It was one of a hundred similar apartments — well-lit, comfortable, almost luxurious. It was built to make one man as happy in isolation as possible.

A soft *ping! ping!* came from the solidiphone signal.

Zavacki looked up, scowling. *Oh, goodie! I have friends*, he thought sourly as he tapped the contact plate. Would people never learn not to call while he was working?

The wall on the other side of the desk vanished, and the heavy body of Division Chief Baedeker was suddenly seated on the other side of the desk. The expression on his round face was that of a badly worried man.

Before he could say anything, Zavacki said: "Deck, if you've come to unload some of your worries on me, you can just trot them off to someone else. I'll listen to them tonight after work, but not now. I'm not a psychologist or an Advice-to-the-Lovelorn columnist."

"This is business," Baedeker said in his growling, rumbling baritone. "And if you can't be civil, be quiet. Or I'll fire you."

Zavacki couldn't help grinning. "Gee! Such a threat strikes fear into the very depths of my miserable and penitent soul. All right; if it's business, I'll listen."

Baedeker smoothed a palm over the top of his balding head, wiping off the beads of perspiration that glittered under the overhead lights. He was a gross man, palpably, ballooningly, bulgingly fat. On Earth, the rolls of flesh would have sagged under the gravitational pull, sagged into ugly, baglike gobbets of dough. But the meager pull of Luna left him round and plump, like an exagger-

ated rubber kewpie doll inflated to the limit.

"Have you been reading or listening to the speeches of Delegate O'Dowd?"

Zavacki pulled black, bushy brows over black, deep eyes. "No. I don't pay any attention to Earth news. Why?"

"That's the trouble," Baedecker said, sighing gustily. "Nobody here has any time for anything but their own projects. O'Dowd is trying to get the Stellar Exploration Laws revised."

"What's this got to do with linguistics?" Zavacki slapped his desk top.

"If you'll be quiet, I'll tell you. O'Dowd has been jumping on quarantine for a month or so now. We've been sending out press reports replying to his charges, but nobody pays any attention to them after O'Dowd gets through with them.

"A while back, he was saying that the men here are 'imprisoned against their will.' They are poor, down-trodden heroes who, after giving their all for humanity, have been locked up for nothing they have done."

Zavacki chuckled softly. "So what's he saying now?"

"Well, we sent down a press report—an interview, sort of. We said that most of the Primary Explorers were perfectly happy here and liked their job. He talked around it for a while, but now he's portraying the boys as a bunch of loafers who are sitting around drawing fantastic

wages for doing nothing—wasting the taxpayers money and so on."

Zavacki shook his head. "I could have told you that approach wouldn't work."

"Probably you could have," Baedecker said. "That's why I've come to you now. I have some more press releases; I thought you could reword them so that they'll have more impact on the public, if you see what I mean."

"I see what you mean," Zavacki told him, "but it's not my job. It isn't linguistics; it's mob psychology. Put a psych man on it."

Baedecker closed his eyes and pursed his lips. For a second, he didn't speak. When he did, his voice brought out the words in slow, measured cadences, reminding Zavacki of the determined, ponderously powerful tread of an elephant moving toward a known goal and brooking no opposition whatever.

"Now, you listen to me, Alexander Dubois Zavacki. I just happen to be Division Chief and Permanent Supervisor of Lunar Base. I do not like to shove my weight around, but"—he shifted slightly in his chair, and it creaked under his hundred and seventy-odd kilograms of mass—"but I have plenty to shove around if necessary."

His eyes came open again, and there was a steely glitter in them. "The SEACA has been my life for thirty years, and I expect it to be my life for another thirty or forty, until I get too old to think clearly

or I get bored with the job. Right now, I'm neither, and I'm not going to sit pat and let some wild-eyed demagogue like Delegate Daniel O'Dowd pull my job to pieces. I'll use every weapon at my command to fight him. You are one of those weapons—perhaps my best one."

Zavacki waited quietly. Baedeker obviously meant what he said. And, in spite of his huge body, he did stand a good chance of living well past the hundred mark. On Earth, his huge mass would put a strain on his heart that might do him in early, but there on the moon, it hardly made any difference.

"And don't give me any guff about getting a psych man on the job," Baedeker continued. "Mob psychology is an art, not a science, and you know it." He closed his eyes again and waved a hand.

"On November 18, 2084, at the Linguistics School of Berlin Polytech, a demonstration was staged—a student uprising protesting a proposed ruling by the Board of Regents. The main leaders of the demonstration were suspended, but they were eventually reinstated, and the rule was never passed.

"The one thing that the Board never knew was that the guiding genius behind the whole operation was one Alex Zavacki." Again Baedeker's eyes opened, small dots of eyes in a huge round face. "And then again, in Omaha, in 2091—"

Zavacki raised both hands. "Please, Deck; I surrender! Spare me the follies of a misspent youth."

"All right, then. Will you take a look at these press releases and see what you can do with 'em?"

"Send 'em through, Deck; I'll see what there is to do. And if you have any of O'Dowd's statements, send them over, too; see that they're all dated so that I can correlate 'em."

Baedeker nodded and broke the contact. The wall became a wall again as the Leinster projectors behind it ceased to function.

Within minutes, the reproducer on Zavacki's desk was quietly pushing out facsimiles of the press releases and the statements by O'Dowd and other related material.

An hour later, Alex Zavacki was staring out of the huge window of his apartment, looking at what might aptly be termed the Solar System's busiest bottleneck. On a dome in the distance, large block letters proclaimed: LUNAR QUARANTINE STATION. And, below that, in smaller letters: *Five Year Section*.

Beyond it, the slender prows of interstellar vessels pointed skyward. There weren't many such vessels in existence; only a few were needed as yet, and they were highly valuable and very expensive. The Interplanetary Engineering Corporation of North America made them, as it had built so many of the fleets of interplanetary vessels that moved outward to Venus and Mars. But there was no need for fleets of faster-than-light ships—not yet.

Above everything hung the shining globe of Earth, bigger and

brighter than any harvest moon, shedding its Earthlight over the Lunar landscape.

Very pretty; very imposing. And about as bleak a place for a man to spend five years of his life as could be imagined.

Zavacki thought of the others imprisoned in this section.

Raoul Jackson, the strange, lonely man with the piebald skin—part brown, part white—who couldn't stand the sight of his particolored face in a mirror. He'd been born that way, and he hated himself for it. He spent his time working on a perfect weapon—for alien beings, he said, but Zavacki had a hunch he was sublimating a desperate hatred for humanity.

Then there was Jack Wessler and his wife, the only team in the Section. They had gone out together for their year of exploration, and had come back and gone into quarantine together. They hadn't wasted any time, either; in the past four years, they had produced three daughters — charming, wonderful kids.

And then he thought of Jennifer.

Sweet, warm, incredibly lovely Jennifer.

Had he been wrong to leave her behind on Earth while he went out, wild-goose chasing across the galaxy? Six years is a long time to ask a girl to wait; she would be nearly twenty-seven by the time he returned. Would it have been better to ask her to come with him?

He shook his head. Jennifer Ster-

ling was not Lana Wessler. Jen was no coward, and she wasn't weak, but exploratory work on a violent, uninhabited planet just wasn't her cup of tea.

No; the six years would have to be waited out. There had never been any question of either releasing the other, but Zavacki had had to go. He'd been assigned his planet and done his job on it in order to gain access to the records of the nineteen colonies. His work in linguistics, covering a unique situation, was worth almost every sacrifice. But not the sacrifice of Jen.

Because some of the explorers never came back. The one-man ships were equipped with robotic return devices; if an explorer didn't come back to his ship within the specified time, the ship automatically retraced its path through space to the Solar System, bringing back the recorded statements of the explorer. Each man carried at all times a radio with a beam locked to the ship; the throat mike picked up every word and recorded it.

Some men had died violently. Hearing those sudden, agonizing screams from the tapes was chilling. But others died of disease, and their words were sometimes even worse.

The word "disease" is like the word "insanity"; they both cover a multitude of afflictions which aren't necessarily related to each other at all. A man is "insane" if his mind is malfunctioning to a marked degree, regardless of what the cause

of that malfunction may be. If his body goes wrong, it may be classified as a "disease."

Pneumonia, measles, arthritis, angina pectoris, chronic hiccoughs, appendicitis, cataract, leukemia, cancer, gangrene, and hives can all be lumped under the same heading for no other reason than the fact that they are all malfunctions of various organs and tissues of the body. Something has gone wrong, and the body has reacted to it in a particular way which is detrimental to the life expectancy of the organism. But, in that case, why aren't mosquito bites, ingrown toenail, and sunburn "diseases"?

Well, they just aren't, and that's that. Such are the vagaries of language.

Up there, in the blackness of the lunar sky, was Earth. On that isolated globe, life had been evolving for something like two thousand million years. During that vast span of time, billions upon billions of organisms had acted and reacted, fought, killed, and died for the right to live. And during that time, a vast check-and-balance system had been worked out. Not a static system, but a dynamic one, a system that was always changing, shifting, and yet always the same.

Ambrose Bierce defined *edible* as: "Capable of being eaten, as a worm to a pig, a pig to a man, and a man to a worm."

Occasionally, one type of organism gained on another, and a whole species would die because they

couldn't adapt fast enough. And the judgment of the rest of Nature was: "It served them right; those who cannot keep themselves alive deserve to die." A harsh judgment, perhaps, but nevertheless valid during most of the struggle.

Man was one of the myriads of organisms that had evolved in that aeon-long struggle for supremacy, and Man had fought grimly, doggedly, not only to hold on to his position, but to push his way up. Individuals, failing, fell by the wayside, killed by their environment, but the survivors learned from those failures and pushed on, still climbing.

The bigger animals were soon conquered. A whale can be harpooned; a rhinoceros can be trapped; an elephant can be shot; a wolf can be kicked to death; and a leopard can be strangled.

But the smaller animals are more numerous and more elusive. Mice and rats remained dangerous to man long after the tiger had become a sporting target and the gorilla had to be protected from hunters. And flies, lice, ticks, and mosquitoes hopped and flew to bite and chew their victims even yet.

A forty-five caliber automatic will stop a charging bull in its tracks. Ever try to shoot a housefly with one?

And the most dangerous of all were the microorganisms—the amoeba, the fungus, the bacterium, and the half-living virus.

Zavacki shifted his eyes to look past Earth at the stars beyond. What

might be waiting out there? What *thing* might be biding its time, waiting for Man to find it, so that it could destroy Man?

And the gobble'uns 'll git you, ef you don't watch out!

Man had clawed and bit and stabbed and shot and poisoned his way to supremacy on Earth. But Earth was not enough for Man; he had more grandiose plans than that. He still had the Universe to lick.

Unless, Zavacki thought, some utter fool like Delegate O'Dowd leaves us wide open for anything that comes along.

He turned from the window and went back to the papers on his desk, leafing through them without rereading them.

What was O'Dowd up to? And why?

Zavacki considered his linguistic work to be of immense long-range importance. But Delegate O'Dowd was of more immediate importance.

He picked up a pencil and began making notes in the margins of the papers. Two hours later, he read them over carefully, tossed them into a file basket, turned on his recorder, and began dictating:

"Press releases from Lunar Quarantine, 27 October 2106—"

All Saints' Day had dawned over Greater New Orleans with only the faintest traces of wispy cloud in the sky, and by noon even these had disappeared, leaving the heavens a warm, spotless dome of blue.

Jennifer Sterling strolled along

the second level walkway, breathing in the rich autumn air with heady pleasure. It was a wonderful day! A *beautiful* day! Even here, in the City, it was spicy and spine-tingling.

For a moment she thought nostalgically of Vermont. What must it be like up there now? Would the trees have lost all their yellow-and-red beauty? Would they be just naked things, holding their gnarled arms to the sky, standing ankle-deep in their discarded clothing? Or would they still be decorating the New England countryside with stationary clouds of gold and vermilion?

Should she fly up and—see for herself? It was a lovely idea, but she discarded it almost at once. She had work to do, and New Orleans was beautiful in its own way.

Below her, on the traffic level, the cars moved through the streets in humming streams, and above her the tall buildings speared up toward a clear, clean sky.

It was nearly a mile from St. Philip's to her apartment, but she had walked all the way down, and was now walking all the way back.

Her mouth curved in a soft smile as she thought of the story about the carrier pigeon who had arrived seven hours late with a message.

"It was such a beautiful day," he'd said, "that I thought I'd walk."

There was a soft buzz from the bracelet at her wrist. She lifted her arm and pressed the little stud on the bracelet.

"Jennifer Sterling here," she said.

"There is a communication from

Luna for you. Can you be at a solidiphone within the next fifteen minutes?"

"From Luna?" There was excitement in her voice. "I'll be home in five minutes!"

She took off at a sprint, heading for the nearest aircab landing.

She made it well within the promised five minutes. She took the drop from the roof to her apartment, unlocked her door, threw her hat into a chair, and ran for the solidiphone. After identifying herself, she waited for the call to be put through. Then, suddenly, the wall faded and Alex was sitting there.

"Hi, honey," he said, a faint huskiness in his voice.

"Alex . . . oh, Alex."

And then, for a long moment neither of them said anything.

She was tall and slender and delicately-boned. Her oval face was finely molded, a perfect setting for the large, warm hazel eyes. Her dark brown hair was brushed back from her face like a glossy helmet of some dark and deeply polished wood, but with a softness no wood ever had.

At times, when it suited her, she could look coldly beautiful—regal and untouchable. At others—like now—she was warm and soft and loving and a thousand times more beautiful than anything he had ever seen before.

His hands and arms ached to touch her, but he held them rigidly on the desk that seemed to separate them. Because more than a desk

separated them; years of time and thousands of miles of empty space were between them.

And yet, the image from the Leinster projectors was so real that it almost hurt him to look at her.

"I love you, Jen," he told her for the thousandth time.

And for the next few minutes, their conversation was a soft babble of words. Soft words, meaningful words, emotional words. Sweet sounds that conveyed only love and tenderness.

Then, finally, Jennifer said: "It was wonderful of you to call, Alex, but—the *expense*. Luna-to-Earth calls aren't cheap."

"Official call," Zavacki said. "I need a spy."

"A spy? What on earth for?"

He grinned. "What on *Earth* for? I don't need one on Luna, so—"

"Alex! Don't be silly! Get to the point."

"O.K. Have you read any of the press statements or heard any of the speeches made by Delegate O'Dowd?"

Jen shrugged slightly. "Some of them. He's trying to speed up interstellar colonization. Relieve congestion on Earth and that sort of thing."

"That's right. Free land. Two farms in every pot. Clear out the crowded areas."

She nodded. "And he's trying to save the taxpayer's money. Something about cutting the budget on the Interstellar Program—but I

don't see how he can do that and still speed up the Program."

"Oh, he's got a method," Zavacki said, a trace of irony in his voice. "Now, we're trying to fight him. A few days ago, I sent out some press releases refuting some of the things he's been saying. This afternoon, he's broadcasting his reply. I want you to listen to it and read all his statements of the past month. I want to know what the general public reaction to his position is. Got me?"

Jen reached for her notefile. "Sure. Too bad you can't take a poll, like the Agency does—a Public Reaction Test."

"I haven't got that kind of money. Call me back collect as soon as you get any data." He smiled. "'Bye, baby.'"

She managed a small smile. "Bye."

They cut the circuit without another word.

Jen simply sat there for a moment, looking at the screen. Then she shook herself and reached for a cigarette from the dispenser. She puffed it alight and then leaned back in her chair—smoking, staring at the ceiling, and thinking.

It shouldn't be hard to get the reactions to O'Dowd. It was the sort of work she'd been trained for. Four years before, when Alex had taken his position with the Interstellar Program, she had taken a job with Continental Advertising. She had to have something to do during

the long years they would be apart.

A degree in psychology was just what Continental wanted. In order to determine the mass reaction to their advertising campaigns, it was necessary to test and tabulate—dig into the psychology of the "average" mind—to see exactly what sort of advertising would sway the public.

The question at hand, then, was similar. How much had O'Dowd impressed himself on the public mind? How good was his advertising campaign?

She dropped her cigarette into the disposer and dialed the public communicator one-way. The tank came on. A blonde was singing a torch song in a throaty voice. Jen twisted the selector switch to Channel D-62, and the throaty blonde gave way to an impossibly distorted little character who bounced around singing, to the tune of "Three Blind Mice":

Try Magna-Vita! Try Magna-Vital!
Oh, to be a bicentenarian,
You will find that it's certainly very
un-Necessary to be vegetarian!
Try Magna-Vita!

Jen winced. After eighty years of being obsolete, the singing commercial was coming back again. Evidently, there was a certain segment of people to whom it would always be effective. And, after all, the gooney-looking little tri-di cartoon man *was* kind of cute.

She waited through the commercial and the station break.

Then, eight-inch high letters floated glowingly in the tank.

MEET THE PEOPLE!

She lit another cigarette and leaned back to watch.

Delegate Daniel O'Dowd was a barrel-built man inclining slightly to fat. His face was broad and blue-jawed and darkly handsome in an odd way. His hair was almost blue-black, wavy, and receding slightly from his forehead. He was in his mid-forties, but looked younger. He sat easily in a chair, a friendly, almost benign smile on his face, while the interrogator made his little speech.

"Delegate Daniel O'Dowd, First Class Delegate to the Congress, has consented to appear before us today to explain some of the purpose behind a bill he has recently introduced to the Congress. I have some questions here which have been sent in by accredited news analysts in regard to the recent press releases from the Lunar Station, but before we go into that, Delegate O'Dowd will give us a little background on the subject, Delegate O'Dowd."

O'Dowd leaned forward slightly in his chair. "This bill, as most of you know, concerns something that is vital to all of us—Man's Conquest of Space." His voice was smooth and easygoing, but with just the right touch of urgency behind it.

"A little over a century ago," he continued, "the Bell-Kimball drive



took mankind to the stars. I'm sure you've all heard the story of Project Elsewhere.

"Now, at that time, the Stellar Exploration Laws were enacted. These laws were enacted to safeguard the populace of Earth against life-forms that may exist—somewhere—out there." His hand gestured upwards.

"Please understand, my friends: those laws were perfectly sound legislation—for *their time*. Let's see what they are.

"Back then, they knew less of disease than we do today, so they provided for the quarantine of any man returning from an extra-solar planet—a quarantine of five years for men returning from previously unexplored planets, and lesser quarantines for planets which have been partially explored but not colonized.

"Then, if the planet has been proven safe after extensive exploration, a selected group of colonists is landed, supplied with all the needs that the Service feels is necessary for them on that planet. And then—for two full generations!—they are cut off from contact with Earth. Except"—and here he made a deprecative gesture—"of course, for semiannual subradio reports."

He spread his hands. "As I have said, those laws were all right a century ago. But, my friends, times change. As we learn more and more about the science of medicine and the conditions on extra-solar planets, we must adjust those laws to fit our knowledge. We cannot—we *must*

not—allow ourselves to be hampered by laws a century out of date."

He narrowed his eyes slightly and held up a finger. "And make no mistake! We *are* being hampered.

"Our Preliminary Survey groups are finding livable, Earth-type planets all the time. In the past century, nearly a hundred have been charted and explored. But only nineteen of them have been colonized.

"After the preliminary survey—which is done from space—the explorers go in. They stay a year, and then return to Luna, their job finished. And what happens? They are imprisoned for five more years!"

The delegate paused for just long enough, then went on.

"My friends, there are better than four billion people on Earth. We're crowded, and getting more crowded. Many of you, I know, are the tough, pioneering type of people; the kind of men and women our ancestors were. We need these new lands; these planets must be opened up to the people.

"It's not a deadly struggle for existence out there; it's good land and plenty of it, with all the aid and comfort that Earth's manufacturers can give you. That land belongs to *you*—and I intend to see that you get it!"

Then he leaned back in his chair. "I believe you had some questions?" he said to the news interrogator.

"Yes, Mr. Delegate," the interrogator said, pulling up another chair.

(My! How cozy! thought Jennifer.)

"I understand," said the personable young man, "that you intend to make two changes in the Stellar Exploration Laws; would you mind telling us what they are?"

"Actually, there are three," O'Dowd said, "although the first two are very closely linked." He held up a hand and began ticking them off on his fingers.

"One: Limit the isolation period on newly-colonized planets to one generation. Two: Take the limit off the quotas for colonization after the isolation period. And Three: Reduce the quarantine period of the primary explorers from five to three years."

"Wouldn't that last change subject Earth to greater danger from extraterrestrial disease?"

The delegate shook his head. "Not at all. The record shows that any extraterrestrial disease shows up within the first year. Most of them show up within the first month. None has ever shown up after the second year. Three years is a perfectly safe margin."

"What effect would such a change have on interstellar exploration, Mr. Delegate?"

"Let's take a look at it. In the first place, the Primary Exploration Division is terribly understaffed. Only a few men are willing to be locked up in an isolation ward for five years after exploring a single planet. There are more men in the Secondary Division—a great many

more. Why? Because they don't have to stay locked up as long.

"Besides, there's the money angle. During those five years, the men aren't doing anything productive. I don't mean that they don't deserve the money; they do. But wouldn't it be better for them—and for us—if they were locked up for only three years and then given their year's vacation on Earth? That way, each man could make an exploration every four years instead of every six, increasing the number of explorations by one third, and, at the same time, attracting more men to the service." He tapped his palm with a finger to emphasize. "When this bill passes, every man up there who has passed his third year in isolation will be able to start home immediately for his year's vacation."

There was more. There were other questions, other answers. But Jennifer Sterling didn't hear any of them too clearly; her mind just held one thing.

If O'Dowd's bill passed, Alex would be home within four months!

Alex Zavacki hurled an ashtray and shouted: "Why, you dumb, bird-brain!"

The ashtray bounced harmlessly off the invisible wall of the communicator tank and clattered to the floor. The image of Delegate O'Dowd smiled while the interrogator thanked him for his time. Zavacki cut off the beamcast and the wall regained its visual solidity.

Then, his anger somewhat molli-

fied, he bent over and picked up the ashtray. His anger came back when he found that the disposal mechanism inside was ruined.

He almost drop-kicked it across the room, but his better judgment slapped some reason into him, and he put it gently on the desk.

Then he sat down and got Baedecker on the communicator.

"Did you hear him, Deck?" he said, as soon as the fat man solidified across the desk.

Baedecker nodded heavily. "I heard him. Didn't pay one bit of attention to your press releases, did he?"

"Sure he did!" Zavacki snapped. "He paid close attention! He *studied* 'em! There's no other way he could have waltzed around the facts so easily!"

Baedecker nodded again. "Just like I said. The boys and I have been trying to get people to notice us for the past month or so. I'd hoped maybe you could do better." He sighed gustily.

Zavacki's jaw set. "I will. I'm mad, now." He didn't sound angry; he sounded cold, grim. "Do you know what's the matter? Ninety-nine per cent of the population of Earth hasn't got the slightest idea of what we're up against or what's going on here. I'm going to tell 'em. I want you to give me a free hand—let me do it my way, without trying to tell me what to do. Will you do that?"

Baedecker blinked. "Wellll—" He blinked again. Then: "That's a

pretty big order, Alex. I don't think—"

"Maybe you don't, Deck," Zavacki interrupted. "Maybe you *don't* think, and maybe that's what's the matter."

The fat man shifted his weight in his chair, and his eyes became colder. "Look here, Zavacki; I've worked on this problem for two months, ever since O'Dowd first opened his mouth.

"The trouble is, we haven't got anything to fight with. We know that the five-year quarantine is the shortest time we can possibly use. Diseases like cancer can recur in that time. But—we haven't yet contacted an extraterrestrial disease that has waited that long. We've tried to fight him with facts, but we don't have any evidence.

"We're facing a problem similar to the one atomic physicists of a century and a half ago faced. They knew cumulative radiation could be dangerous to the gene plasm, but they had no way of proving it experimentally. We know the answer to that now, but do we have to go through that sort of thing again?"

"We just don't have any evidence, Zavacki."

"You just don't know how to fight," said Zavacki. "Look, do you happen to know *why* O'Dowd wants to change the law? I mean, What's his *personal* reason?"

Baedecker's heavy brows came down over his eyes. "I don't know; I never thought of it. Why?"

"He has one," Zavacki said posi-

tively. "The O'Dowds of this or any other world always have a personal reason. Power, money, prestige. They don't try to bull something like this through for the sake of the great masses.

"Now, if we can find out what he, personally, is getting out of this, we may have something to work on. The first thing to do is get your men busy looking into his connections. You have agents, on Earth—use them.

"Find out if he's being bribed. It won't be easy, and it probably won't be enough evidence to use in court, but we still might be able to use it ourselves. Figure out who would benefit if the bill is passed, and then see if they've been helping to line O'Dowd's pocket.

"Meanwhile, I'm looking into another angle. I have a hunch that O'Dowd wouldn't object to being Prime Delegate. If he's doing this for popular support, we may be able to attack him from that angle."

The fat man was silent for a full thirty seconds. Then he nodded his head slowly and said. "O.K., Zavacki. Handle it your way. Maybe you've got weapons I don't even know about."

Alex Zavacki grinned lopsidedly. "Deck, you don't *have* weapons; you *make* 'em." Then he slapped the cutoff.

Be sure you're right—then go ahead. Jen Sterling wasn't quite sure who'd said it—some politico, she supposed—but she liked the senti-

ment behind it. It had taken her two hours of hard self-searching to be sure she was right. Now she was going ahead.

She didn't like what she was going to have to do, but, having made the decision, she knew she could carry it through without a hitch.

It took nearly two days to make the proper connections, but the proper use of her connections with two government officials, plus the judicious use of her beauty and powerful personality had cut through about five parsecs of very red tape.

On the morning of the third day, she took the nine o'clock stratoshuttle to Long Island. Five hours later, she was in Switzerland.

She took an airtaxi to the World Organization Building and took the drop chute down to the office of Delegate Daniel O'Dowd.

O'Dowd looked much as he had on the tank; the Leinster projectors had duplicated him perfectly. He looked just a little more rumpled than he had on the news broadcast, but he'd been hard at work all morning, which excused his appearance.

He waved Jennifer to a seat and smiled his most engaging smile. Jennifer took it and out-smiled him with a flash of white teeth.

"I understand, Miss Sterling," he said, "that you are deeply interested in seeing my bill on the Stellar Exploration Laws pass. However"—he tapped a flimsy on his desk—"your radiofac isn't too explicit."

The girl raised an eyebrow a fraction of an inch. "I didn't think it would be very smart to let it out over the radiofac network."

"You could have called—"

"And have it tapped?" She shook her head. "No thanks."

O'Dowd frowned. "Really, Miss Sterling, I see no reason for this secrecy. The bill is perfectly honest and above board."

The look on Jennifer's face suddenly became one of trusting innocence. As O'Dowd softened, she said: "Oh, I *know* that! But, you see . . . well, I have a personal interest in getting that bill passed."

"Oh?" Noncommittally.

She said nothing for a moment, pausing to glance around at the metallic austerity of the office—so similar to the room in which Alex worked, the room in which she had seen him so many times in the past three years, but never touched him.

"Very well, Miss Sterling," the delegate said after a moment, "I shan't pry into your personal affairs. If you are backing my bill, that's good enough for me. If you would write—"

She shook her head quickly. "Mr. Delegate, do you know anything about popular opinion sampling?"

"Polls? Some, certainly. Most members of the Congress try to keep their fingers on the public pulse; they'd be very poor representatives of their constituents if they didn't."

Again the headshake. "I'm not talking about that," Jen said. "Look here; do you know anything about

advertising?" She didn't wait for him to say anything, but rushed on. "Let's say you're advertising a product like . . . oh . . . breakfast food or toothpaste. You're not interested in whether the public *likes* your product; you want them to *buy* your product."

O'Dowd's eyes narrowed just the slightest. "I see the distinction; go on."

"You do your best to make it as good as possible and then you advertise it. Take toothpaste. As long as it cleans teeth, tastes good, and contains one of the really efficient anti-cavity compounds, that's about all you can do with it. What more do you want?" She paused for effect.

"You want to *sell* it. And that will depend on the advertising—the packaging, the communicator ads, that sort of thing.

"Now, it's rather easy to check on how good your advertising is; it's a function of your sales. If your initial sales are low, then you want to change your advertising.

"But which way? How? To what extent? *That's* what you want to know, isn't it?"

O'Dowd's eyes had become even narrower, and a faint, flickering smile played around his mouth. "I don't believe I'd ever thought of it quite that way."

"Yes, you have," Jen said candidly. "Politicians have been doing it since the beginning of time, and you are a very good politician. But

you do it by feel—by guess. How long do you think a modern businessman would last if he used advertising that way?" She snapped her fingers with a dainty flick of her wrist. "Or, at least, not *much* longer."

"I'm following you, Miss Sterling."

"Good. Advertising, today, is something like medicine. It's a scientifically based art. Because of advertising, we know more about mass psychology today than any other type of psychology. About the individual, we can predict almost nothing; but with a population of four billion, we are approaching the Asenion psychomathematical formulas in accuracy. The Asenion formulas only work perfectly with an infinite population, of course, just as the gas laws only work perfectly with an ideal gas, but—"

"Just a minute, Miss Sterling." The delegate held up a hand. "I'm not acquainted with the formulas you're talking about; I don't understand that sort of thing at all. But am I to understand that, through advertising, you could definitely swing the passage of this bill?"

"Yes. With . . . say . . . an assurance of sixty-five to eighty per cent of the votes in your favor."

O'Dowd began chuckling; a deep, rumbling laugh that came from his chest. "I can see it now! A singing commercial: 'Don't be bullied, don't be cowed; Vote with Delegate O'Dowd!'" And, after another burst of laughter: "No, Miss Sterling; I'm

afraid it's out of the question."

Jen waited patiently until he was through laughing, then said: "I'm afraid you misunderstand, Mr. Delegate. We know perfectly well that that kind of thing won't work with political advertising. A lot of commercial-type advertising *is* used, as you well know. Such things as: 'Vote for So-and-so,' and the 'It's Your Duty to Vote,' but the kind of advertising I'm talking about is just the kind that you are using at present."

"What you need, you see, is some kind of check on the effectiveness of your speeches. You want to know how you can say what you have to say so that it will influence the most people in your direction. And that's what I meant by popular opinion sampling."

"What we can do is find just exactly the kind of tone, expression, and rhetoric you should use in your speeches and press releases, just as we can find out what kind of package and singing commercial to use to sell toothpaste."

O'Dowd was looking thoughtful again. "Why haven't other politicians used this?"

"Quite simple," Jen said, "the trouble is money. To put on a really scientifically successful advertising campaign runs into money. That's the reason advertising is the most scientific branch of psychology today—because the businessman was willing to put plenty of money into it for research. A project like that takes the kind of money that only a gov-

ernment or the pooled resources of several big commercial concerns can afford to spend. It still costs money; if it didn't, every little two-bit concern that went into business would immediately be successful."

"Oh? You can guarantee it that closely?"

"If the product is worth while, yes. And your bill is."

"Well, yes, but I've swung bills before without any special backing," O'Dowd said.

"Have you tried swinging one like this? What about the opposition you're getting from the Stellar Exploration Commission?"

O'Dowd was silent.

"And," Jen went on, "how about the average little guy who's going to be scared witless over some horrible disease from space?"

"I'll admit there is some lobbying," O'Dowd said quietly. "Just how much *would* this cost?"

Jen named a figure. O'Dowd raised his brows in surprise, but said nothing.

"I think you'd find it worth it, Mr. Delegate," Jen said.

O'Dowd glanced at his wrist watch and stood up. "I have an appointment in a few minutes, Miss Sterling. I want to thank you for your interest; if I feel your suggestion has any merit, I'll let you know."

Five minutes later, she was on the roof, waiting for an aircab. And wondering.

Alex Zavacki stared at the image

of the girl across the desk from him.

"You *told* him? *Jen!*" He groped for more words and couldn't find them.

"I told him," she repeated. "I gave him a line of gobbledegook a mile long and twice as thick."

"But—*why?*"

She tried to keep her voice steady—and succeeded. "I thought about it for a long time, Alex. Please don't interrupt; let me explain.

"I didn't realize what O'Dowd was doing. I didn't know that if his bill passed you'd be home in a few months.

"At first, it hurt me to think that you'd fight such a bill. It seemed to me you'd jump at a chance to see . . . to see me as soon as you could."

Zavacki forced his half-paralyzed throat to speak. "Jen, Jen, baby! I *do* want to come home! But, can't you see, this thing is—"

"I know, Alex, I *know!* Please, let me finish. I know it's important to you—and you believe it's important to everyone. You can let personal considerations go by the board.

"But I'm a woman, Alex. I can't think like that; I can't understand it, completely. As long as there's nothing wrong with *you*, I want you here, with me.

"On the other hand, I couldn't work against you. If getting that bill passed is the wrong thing, I'd hate myself; I couldn't live with it.

"So I had to see that the job was done right. This project needs thorough research—polling that I can't do alone. It's got to be run through



the biggest and best computers Continental has. It's got to be done *right*.

"If this bill is passed, and Earth is exposed to danger, it will be one of the greatest mistakes we've ever made. But I don't *know* . . . I'm not *sure* that the quarantine has to last five years. If such long quarantines really aren't necessary, they should be reduced.

"Since the polls are necessary, Delegate O'Dowd—or whoever's backing him—should pay for it."

"What did you tell him?" Zavacki asked quietly.

She explained exactly what she had told the delegate.

"I see," he said. "In other words, he's going to expect to get advice from you on how to conduct his campaign most effectively. We've got

both ends of the game under control. We can tell him exactly what to say—almost. We've got him right where we want him, and he'll have to accept our advice because he's *paying* for it."

Then he stopped, looking at her face.

"Oh," he said very softly. "I see."

Her voice was only a trifle strained as she said: "I can't let you do that, Alex. If he gets bad advice from Continental Advertising, he'll ruin them. And he won't have to get a bill passed to do it. I don't give two hoots about my job, but I won't jeopardize an outfit that has been good to me."

He nodded. When Jennifer talked like that, she meant every word she said.

"You did the right thing, anyway," he said. "Give him the best advice we know how—and see if he trips himself up."

"There's just one thing, Alex." She paused and took a deep breath. "You're going to have to figure out the best thing for him to say and do, yourself. You know the Asenion equations are meaningless for less than a hundred quadrillion people."

He nodded slowly. "I know; I know." He lifted his eyes and looked past her. The broad window of her apartment let in the sparkling sunlight of autumn, making a gleaming yellow rectangle on the rug.

She had given him both sides of a chess game and expected him to play both sides honestly. He had to handle Bacdecker and O'Dowd—

yes, and even Jen. But, worst of all, he would have to handle himself.

It was almost as though she could hear his thoughts. "Alex, Alex, I *know* you can do it!"

It was almost frightening to see what tremendous confidence the girl had in him. And he knew he could not betray that confidence—ever.

But one slip—one little slip—is all it would take. He half hoped that O'Dowd wouldn't take her proposal.

"Don't look that way, Alex—please! It'll be all right in the end!"

And then, quite suddenly, his smile came back. That was it! If a problem is handled with equal ethics on both sides, whichever side is right—in an absolute sense—will come out on top.

He said: "I'll handle it, honey—and thanks."

But when he cut off a few minutes later, his only thought was:

Please, God, help me to do it right!

It didn't take long for Delegate O'Dowd to bite. The undeniable fact that Jennifer Sterling was a warmly beautiful woman may have had something to do with it, but O'Dowd was too shrewd a politician to allow something like that to sway him too much. Like any good political man who is even moderately successful, he had his own sources of information. It didn't take him long to find out that Jennifer actually held the position she claimed she did with Continental Advertising. Nor did it



take him long to discover that the man she loved was quarantined on the moon.

He knew that good advertising was successful, and he had no reason to believe that the line Jennifer had given him was just so much hokum. After all, he was used to relying on the word of experts, and this woman was obviously an expert. Jennifer Sterling was a graduate psychologist, held an important position with a top-flight advertising agency, and, so far as O'Dowd was concerned, she had a fine motive for doing her best.

That, he thought, was all he needed to know.

All the arrangements with Continental were made strictly under cover. No one could possibly have

proved that Delegate Daniel O'Dowd had paid out the huge sum of money Jennifer had demanded, nor could he or his underlings have been legally connected with the project in any way.

Continental Advertising didn't mind. All they were being asked to do was conduct a private poll, not get out and stump for O'Dowd. They were being paid handsomely for it, and that was all that mattered. What O'Dowd did with the information was strictly his own business.

When Jennifer told Alex that the bill had been paid in a lump sum, Zavacki whistled softly to himself and put in a call for Baedecker.

"Any news on who's backing O'Dowd, Deck?"

The fat man shook his head slowly. "Nope. Any one of a dozen companies could be sinking money into it. Besides, it looks to me as though he's trying for Prime Delegate. He wants to run the Congress—not just be a member of it. That means he's probably not asking for more than expense money—which wouldn't be much."

"Suppose I told you that he's sunk half a million into a harebrained scheme that's never been tried before and might not work. That he's willing to risk that much on an outside gamble."

Chief Baedecker's eyes narrowed. "Where'd you get that information? And what's the scheme?"

Zavacki grinned and shook his head. "Oh, no, Deck. You gave me this job and told me to handle it.

I'm doing just that. I don't ask you where you get your information, do I?"

Baedecker shrugged. "O.K. I have a policy; when you delegate authority—*delegate* it, and don't meddle." He shifted himself in his chair and looked up at the ceiling. "Half a million, eh? That means there's real money behind this—big money. Could be a group of corporations."

"Huh-uh," Zavacki said emphatically. "Conning a group of corporations takes longer than just talking one out of the money—even if it comes to more money. I'm betting on one of the Big Three."

Baedecker continued to look at the ceiling. "Could be. Atomic Products, Interplanetary Engineering, or General Power. Why not all three?"

"Maybe. I doubt it, though. It takes too much book juggling. One company can cover up; three companies are a little tough to handle. The World Criminal Investigation Division would be on their necks too fast." Zavacki thought for a moment longer, then: "No. It could be, but there's no need playing our cards that way. If we find one, and there are others involved, fine. But just look for one."

Baedecker looked down from the overhead and rubbed his fleshy nose with three sausagelike fingers. "How about getting the WCID on their tails? Might not prove anything, but it might scare 'em off."

"It's too late for that. All they'd do is stop handing money out to the delegate—and he's got enough to

swing the job right now. No, just find out who's backing him, that's all."

Baedecker nodded heavily. "All right. I've got a few feelers I can put out. I'll let you know." He cut the circuit.

Zavacki stood up, stuck a cigarette in his mouth, and puffed it alight. He paced carefully back and forth across the room; under Lunar gravity, pacing has to be done carefully or not at all. Finally, he threw the half-smoked cigarette into an ash-tray, snarled, and headed for the centrifuge for his daily spin. Some men, like Baedecker, never bothered to keep themselves in shape—they never intended to go back to Earth, anyway. But Zavacki did, and he spent an hour a day in the spinner at one point two gees, keeping himself in condition.

And while he exercised, he thought. And thought.

Raoul Jackson cursed mildly and stuck his finger in his mouth. It wasn't a bad burn—hardly even painful—but Raoul Jackson detested sloppy work, and a man who burned himself with a welding gun was, in his opinion, sloppy.

Finger still in mouth, he stood back from the maze of silver and crystal that stood on the wide bench before him. The silver busbar he had just welded faded rapidly from bright red to black as the heat was dissipated through the mass of metal. Raoul flipped the light shield up

from his eyes and gazed at the apparatus almost fondly.

"Brother," he said, "you are the most haywire piece of junk I have ever laid my eyes on." But his rich, baritone voice was softly paternal as he said it.

Almost unconsciously, he lifted the heavy welding gun and looked at it. He pulled the trigger.

At the very tip of the "muzzle," a white, blazing ball of supernal fire appeared—a little ball, no bigger than the tip of his finger. He released the trigger, and, as the ball of light winked out, he glanced back at the "haywire piece of junk."

The original idea had come from the welding gun. The little welder generated enough heat in that little ball of light to weld together a couple of three-inch silver busbars; weld them neatly and rapidly before the silver itself could conduct the heat away. The field of force which surrounded the ball held in most of the radiant heat; only a very small percentage of the energy could escape as useless radiation.

The gadget Raoul was working on was based on the same principle, but it was for an entirely different purpose. If it worked—and Raoul could see no reason why it shouldn't—it would generate a tremendously hot, controlled, and easily focused beam of energy, a beam that could cut its way through a foot-thick slab of steel armor plate in a fraction of a second. A bigger model, with more power behind it, should be

able to make quick work of even cast tungsten.

Raoul Jackson had one obsession. Some day, somewhere, Mankind was going to run into another intelligent race. Out there, waiting, might be *something* with a brain and a high level technology. And Man had better have the weapons to defend himself.

Of course, there were times when Raoul Jackson wondered if he'd complete it in time for installation on his own ship. He'd been working on it for four years, and there was only a year left of his quarantine. And there were plenty of bugs in the thing yet—plenty of them. So far, the thing would only put out about three per cent of the theoretical yield of useful energy required, but things would straighten themselves out in time. If it wasn't ready for the next trip, it would certainly be ready for the one after that.

He slipped the light shield over his eyes and again applied the welding gun to the busbar. As it flared into incandescence, the face shield darkened, automatically compensating for the increase in brilliance.

The solidiphone signaled.

Jackson ignored it for a few more seconds while he finished welding the busbar. When he was through, he released the trigger of the welder, flipped up his shield and turned to look at the solidiphone.

Why did people have to call him? Why couldn't they leave him alone? They were trying to be nice, sure;

trying to be friendly. But they didn't have to. It wasn't necessary for them to look at him; he'd rather they wouldn't. It was bad enough that *he* had to put up with his mottled, piebald face; why should others be forced to put up with it? Or, even worse, force themselves to do it?

He carefully put down the welding gun and walked over to the solidiphone. He sat down and cut in the circuit. The image solidified on the other side of the now-invisible wall. It was Jack Wessler.

"Busy?" Wessler asked. His ever-present grin spread across his wide face, showing white, slightly crooked teeth.

Raoul nodded. "Yes; I'm busy. What is it?"

Wessler kept smiling, taking no offense. People knew enough not to bother Raoul too often, and not to get offended when they found it necessary to call him.

"I hate to interrupt you, Raoul, but I was wondering if you knew about this O'Dowd business."

"O'Dowd? Who is O'Dowd?"

Jack Wessler explained.

Raoul's oddly discolored face became hard. "What's he trying to do? I'll never finish my project if I have to go out again now. I signed up for one trip every sixth year, and that's the way it's going to be."

"Not if they change the law, it won't. Besides, there's talk now of subpoenaing some of us for a Congressional investigation."

Jackson's frown deepened. "Is it that serious?" Then: "They wouldn't

get me down there for anything! They couldn't drag me back! Not with—" He launched into a blistering denunciation of Earth, its Congress, its inhabitants, and its general, all-around despicability.

He didn't notice Wessler's eyes narrowing in speculation, nor the slight fading of his grin.

"Say!" Wessler broke in, "are your pickups O.K.?"

Jackson ignored him. ". . . Think it's funny! Me, all I ask is to be let alone—by O'Dowd and everybody else!"

"You feel all right, Raoul?"

Jackson stopped his torrent of words suddenly, as though they had been dammed up. The muscles at the hinges of his jaw bunched for a moment, then relaxed. "Yeah, I feel all right; little headache is all. From looking at the welder. I . . . I'm sorry, Jack. I'm not feeling too well, I guess. Nervous. Trying to finish my project. You know."

"Sure," Wessler said placatingly. "Sorry I bothered you. But Zavacki said that if any of us came up with any ideas to pass them along to him. O.K.?"

"Yeah. I . . . I'm glad you called. Thanks." And his hand reached out and cut off the circuit.

As Jack Wessler's image collapsed, Jackson looked at his blotchy hand. Part of it was dark brown; part of it was pinkish. Raoul hadn't looked in a mirror in years, but he knew how his face looked—the same as his hand.

He buried his face in his hands.

Oh, Lord, Lord, why couldn't I have been all one color? Why did You have to make me an ugly, discolored monster? Why?

Jack Wessler stared at the wall where Jackson's image had been only a few seconds before. Was there something wrong with Jackson's pickups? Or was there something wrong with the color balance of the Leinster projectors? Or was it imagination?

Or was there really something happening to Jackson's skin?

He stood up, still wondering, and walked into the kitchen.

Lana, his wife, was looking at the code book and dialing her choice for dinner from the autochef. She looked up as he came in. "Dear, will you call the girls while—Jack! What's the matter?"

When Jack Wessler wasn't smiling, there was something seriously wrong.

"You know Raoul," he said.

"What about him?" She had stopped dialing and was looking at him curiously.

"I don't know for sure. He's touchy about the way he looks, you know; most of us don't call him up often."

Lana smiled. "You don't call up much of anyone."

He grinned back. "Why should I? I'm the luckiest guy in quarantine."

"Let's get back to Raoul," she said.

"His face looks funny—as though

the dark blotches were lighter. And he doesn't look well—said he had a headache."

"If he's sick, you'd better call Dr. Fleishmann. How long has it been since Raoul had his last checkup?"

Jack frowned a little. "I don't know; couple of weeks, I guess. Still, he might have something."

They looked at each other for several seconds.

"You'd better call Fleishmann," she said at last. "I'll get the supper ready. When you're through calling, get the girls from the playroom."

Jack nodded and headed back to the solidiphone. Lana looked back at the autochef and realized she had forgotten how far she had dialed. She punched the canceler and started over.

Jennifer Sterling watched Moe, the computer, chew over the figures that were being fed into it from the major trunk lines that spread out to every large city in the world.

She knew about computers and robots in general only in the broadest terms; she knew nothing of the detailed operation of them. But somehow, the big, humming, brooding things fascinated her. So she watched Moe as he digested his data and upchucked his answers on photo-facsimile tape.

The girl who was operating the machine, an impish blonde named Tess, kept an eye on the indicator panel, where the banks of flickering lights told her things that meant nothing to Jen.

"It beats me," Tess said. "I mean, honestly, Jen, this is the weirdest job I've ever seen."

"How so?" Jen asked.

"Well, whoever heard of an advertising agency doing polling work on a politico? Why didn't he just go to one of the big polling companies?"

"Maybe he wants a different approach," Jen said.

"Maybe. I wonder whose bright idea it was?"

Jen shrugged coolly. "O'Dowd seems to know what he's doing." Tess hadn't seemed to have directed the last remark at her, but—was she aware of anything?

"Frankly," Tess said, running expert fingers over the bank of keys at the control console, "I think O'Dowd's a pompous ass, but I don't blame you for wanting that bill to pass. How long has it been since you've seen that good-looking man of yours?"

"Four years," Jen said in a flat voice. "And it'll be two more before I see him again."

"Not if O'Dowd's bill passes."

"No. Not if the bill passes." Did Tess know anything? Impossible. No, she was just trying to make conversation.

"When does the vote come up?" Tess asked. She was still running her hands over the keys.

"January first," Jen said. "Right after Year Day."

"Mm-m-m." She tapped two more plates, stepped back, and brushed her long blond hair back with a

quick gesture. Then she flashed a smile at Jen. "I'm with you, honey. I hope Alex is home by Easter."

Jen forced a smile to her face. "Yeah. I hope so, too."

Moe made humming noises, with a background of faint grumbles.

"He's going to work now," said Tess.

"He?" Jen said, jumping on a chance to change the subject. "Why call it *he*?"

Tess grinned. "Moe reminds me of a man. You know—sits back, chews over all the facts, and comes up with an answer. And then looks so *smug* about it."

The indicator lights flickered; a buzz began somewhere inside, and the photoprinter began putting figures on the facsimile film. It rolled out in a long, wide ribbon. There was a final click. The indicator lights stopped and the machine became silent.

"See what I mean?" Tess said.

Jen nodded as she took the printed roll. There *was* something smug about the big machine.

"I'll have more for you later," Tess said. Then she winked. "And I'll pull for O'Dowd."

Jen thanked her and headed for her office. She went to her desk, threw the photofac on the top of it, sat down in her chair, and pressed the heels of her palms against her eyes.

She thought of the ancient story of Philip Nolan—the Man Without A Country.

Daniel O'Dowd! she thought. *I*

hope I may never bear the name of Daniel O'Dowd again!

But she knew that, unlike Nolan, she wouldn't get her wish.

When Jen's call came in from Earth, Zavacki did his best to keep it as businesslike as possible. He wasn't too successful at first; it took a full minute to get around to the reports, in spite of the full knowledge that each word of endearment only made his inner torture that much greater.

But finally, he said: "Well—what's new?"

And then they both had to laugh at the inanity of the remark.

Jennifer spread the printed facsimile sheet out on the desk. "I'll send you a detailed analysis later, but I can give you the essentials now. Up until today, it looked as though O'Dowd had general public sympathy. They seem to want to open up the planets as soon as possible. In general, the wealthier groups feel that the poor should be given a chance to colonize—get them out from underfoot, so to speak. The poorer groups agree with them, oddly enough, but, of course, they don't phrase it the same way.

"The middle classes form a spectrum in between.

"City dwellers seem to be more in favor of the bill than country people; they seem to feel it would relieve congestion. Most of them don't want to go themselves, but they think other people will. Some of them actually want a little home

in the country—a few light-years away.

"While the farm vote isn't necessarily in favor of the bill, it isn't against it, either. Farmers don't seem to care, one way or the other.

"The industrial bloc—including the World Labor Federation—seems to be . . ."

Zavacki listened as she read, taking notes and asking an occasional question.

It looked bad. Most people actually didn't care, but there was a sizable minority that favored the new bill for one reason or another. A small minority—very small—saw the danger in the change.

The trouble was that this wasn't an election; it was a Congressional vote. That meant that those who were apathetic wouldn't even write to their delegate. The anxious minorities would. A delegate goes by what he gets in the mail, and the pro-O'Dowd faction outnumbered the cons by about twelve to one. That meant the bill would pass unless something drastic was done.

Zavacki felt an inward shudder. If one man—just one—ever got to Earth with an epidemic disease that Mankind had never been exposed to, civilization could be destroyed. Not the race itself, perhaps; if Mankind were lucky, a few might survive. But a handful of people can't keep a modern civilization going.

Man had been hit before—hard. The Europeans' first contact with syphilis in the early Sixteenth Cen-

tury; the Black Death in the Seventeenth; influenza in the first half of the Nineteenth; and the mutated virus that had caused the deadly cerebral poliomyelitis nearly eighty years ago. If it hadn't been for the fact that the medics had known of its existence and prepared an immunizer before it struck, cerebral polio might have wiped out a quarter of the human race.

Jen said: "That brings us up to the press release from Luna this morning. So far, we haven't got all the leads in yet, but it looks as though it might be effective. Still, it isn't conclusive."

Zavacki looked up, frowning. "What press release?"

Jen looked startled. "The one about Raoul Jackson. Didn't you send it out?"

"No. What does it say?"

She rifled through a pile of papers on her desk. "I've got it right here . . . yes, here it is." She held it in front of her and began to read.

"Medical technicians on the moon today announced that Primary Explorer Raoul Frank Jackson, after four years of quarantine, displays symptoms of dermal demelanosis, in which the normal pigmentation of the skin is slowly destroyed. Mr. Jackson, who returned four years ago from the primary exploration of an Earth-type planet of Spica, is the first quarantine resident to display any untoward symptoms after the second year. The cause of the strange disease is as yet unknown."

She looked up from the sheet. "It sounds as though it might do the trick. Is it true?"

Zavacki looked angry. "I don't know, Jen—but I sure intend to find out!" He reached for the cutoff.

"Wait!" said Jen. "What do I tell O'Dowd?"

"The truth. Tell him you've got the trend analysis, but you haven't doped out a counterattack yet. I'll call you back as soon as I get something worked out."

His hand came down on the plate, and her image vanished.

Before he could dial Baedeker, the chime rang. Zavacki switched on and an image coalesced on the

other side of the desk. It was Baedeker.

"I was just going to call you," said Zavacki ominously.

"I dare say," said Baedeker. "I just now heard about it myself." Zavacki opened his mouth to say something, but Baedeker patted the air in front of him with a heavy hand.

"Wait a second, Alex. Before you fly off the handle, let me explain. It's my fault that story about Raoul was released, but I wasn't deliberately pulling the rug out from under you."

"Then what happened?"

"Fleishmann released it. He was



within his rights, and I'd forgotten to tell him that all releases should be cleared through you. It just escaped my mind, that's all." He shifted in the chair, uncomfortable under Zavacki's eyes.

"But I heard about it. I just got a call from the Administrative Secretary. There seem to be several delegates interested in the story."

"What did you tell him?" Zavacki asked.

"Only what Fleishmann said in the report. I told him I had no further news than that." He looked down at his pudgy hands; there was an oddly pathetic look on his face. "I told Dr. Fleishmann that from now on, all medical releases were to be sent to my office before publication. I'll see to it that you get them immediately." He shook his head, and his jowls wobbled. "I'm not used to this sort of thing. I don't know anything about politics."

Zavacki took a deep breath and forced himself to smile a little. "There's nothing to worry about, Deck; nothing has been ruined. I was just a little sore that I wasn't told, that's all. I'll talk to Fleishmann and see what the scoop is."

"Good; good. Anything else comes up, I'll let you know. Thanks, Alex." And he cut off.

Zavacki stared at the blank wall and swore softly but blisteringly. Not at anyone or anything, but in pure amazement and surprise. It had taken every bit of self-restraint to

keep from showing what he had suddenly realized.

Baedecker was frightened. He was willing to let Zavacki take over everything because he knew he couldn't handle it. If there were a Congressional investigation, if Baedecker got a subpoena, he would have to go to Earth. And he hadn't been to Earth for thirty years.

Zavacki unconsciously wiped his hands on his trouser legs. He had been handed both ends of a stick—and both ends were sticky.

After a moment, he dialed Fleishmann.

The medic was a small, wiry-muscled man in his mid-forties. He apologized immediately for the press release, but Zavacki waved him down. "That's all right, doctor. Deck explained the whole thing. It's not your fault, and it's not his. What I want to know is: exactly what is Raoul's condition? How ill is he?"

Fleishmann gave a dry cough. "Not really ill at all, I should say. Slight headache. Skin seems flushed. The melanin content of the epidermis has dropped amazingly, but I can't find any trace of microorganisms above the virus level. We're working on that now."

"Seems odd that a virus could lie dormant like that for so long."

"It isn't unusual. *Herpes simplex*, the common fever blister or cold-sore virus, may lay dormant for years before a local irritation makes it break out at a weakened spot."

"Yeah." Zavacki chewed at his

lip a moment. "Would you say the disease is dangerous at all?"

"I don't know," Dr. Fleishmann said. "Frankly, I doubt it. Generally, anything that the body can keep dormant for that long is, like the fever blister, relatively harmless. And, too, this looks like a fairly local condition. It's quite evident on the face and arms and upper torso, but it hasn't spread below the waist, and the upper back seems unaffected."

Zavacki nodded slowly. "I get you. Well, we'll see how things work out. I don't know how much harm was done, but it couldn't be helped. Thanks a lot, doctor."

"Certainly." The medic vanished.

Inserting a cigarette between his lips, Zavacki leaned back in his chair and watched clouds of smoke float toward the ceiling and then bend suddenly toward the air-conditioning exhaust slots.

Where was he? How did things look? Damn it, he didn't know! How do you fight a war against an unknown enemy? And especially when, in one battle of that war, the unknown enemy itself is your best weapon!

What did Raoul have? Nobody knew, really. Still, didn't it prove that an alien disease could be harbored by the human body, undetected for more than the three-year period O'Dowd was asking for?

How should he advise O'Dowd?

This wasn't something he could ethically advise O'Dowd on; the delegate would have to make his own decision. The only advice he

could ethically give was: "Since it has been shown that your bill is, and could be, dangerous, kill it."

But O'Dowd wouldn't and couldn't do that.

The next move, then, was up to the delegate.

Several days went by before O'Dowd hit. It took him that long to get the information he needed, but when he got it, the delegate let loose an avalanche.

The newsfax had been carrying the story, of course. Raoul's illness was news. The news became even more sensational when Raoul's picture was printed—and it was carefully pointed out that the blotchy brown-and-pink complexion was the one Raoul was born with. For two more days, O'Dowd said nothing; then he was "forced" to answer by some enterprising reporter.

His speech was purposely evasive. He gave the impression that he really didn't want to accuse SEACA of chicanery, but it seemed obvious to the public that the big shots of SEACA were trying to keep the appropriation high in order to put a little cash in their own pockets. Raoul's illness, in other words, was a fake.

Jennifer's polling results a day or so later were conclusive. Those who were apathetic about the bill had begun to swing over to O'Dowd.

Earthside medics were consulted by a few newsmen, but their opinion was divided, as usual, and the public paid no attention, as usual.

On the day after Thanksgiving, Zavacki got a call from Fleishmann. The wiry little man looked apprehensive.

"You asked me to call if there was any change in Jackson. We've had him in his isolation room since we examined him. The skin irritation went away, and for a day or so, his skin looked almost like yours or mine. But now it's darkening again."

"Darkening? How come?"

"Well, we couldn't find anything that even remotely resembled a virus. And, too, the effect remained confined to the chest, abdomen, arms, and face. It looked, frankly, like a queer case of inverted sunburn.

"So one of the boys got to thinking about it and came up with the answer. You know that heat projector that Raoul has been working on for the past four years? Well, the force field around it was oscillating. We checked the frequency; it's just right. It breaks down melanin. The irritation of the decomposition products were causing the slight fever and the headache. As soon as we took him away from the projector, his condition cleared up. The melanin is coming back in the same areas where it had been before."

"I see," said Zavacki. "I was afraid something like this might happen. Have you told anyone else?"

"No. Raoul knows, of course, and so do the rest of us who worked on it. But that's all."

"Keep it under your hat for a

while; it may help if we spring it later."

"All right," Fleishmann cleared his throat. "I hate to say it, but what we need is another Vandervere."

"Vandervere?" Zavacki didn't recognize the name.

"That was before your time, I guess," Fleishmann said. "Vandervere came back from Sargas IV. Went into quarantine. We looked him over in the preliminary examination; X-rays, blood tests—you know; the works. Found nothing.

"About eighteen months later, he began to develop locomotor ataxia; couldn't control his hands and feet. It was pretty obvious that there was something wrong with his brain.

"We X-rayed. The thing looked like a tumor, so we trepanned. It was a worm."

"A *what*?"

"A worm," said Fleishmann. "Or, at any rate, something similar to a worm. We figured that Vandervere must have swallowed or inhaled the egg—they're microscopic. The thing got in the bloodstream and headed for the brain. It took it a little time to grow and become really active. If it had attacked another part of Vandervere's brain, it might have been six years before we noticed it—and that might have been too late.

"Louis Pasteur lived for most of his life with half his brain gone."

"How did it reproduce?" Zavacki asked. "The worm, I mean."

"Eggs. Went into the bloodstream and then into the feces. Stayed dor-

mant until conditions were right, then went to work looking for another brain."

Zavacki could see what something like that might do if it were released on Earth, and found himself being very glad that the wastes from the Quarantine Station were piped through the radioactive wastes from Atomic Products. Radiation of that kind will kill literally anything.

"I see what you mean. If he'd had the thing for more than three years, we might be able to make a case out of it. Having your brain eaten up from the inside like a wormy apple would give most people the cold shivers.

"But we can't use it."

Fleishmann cleared his throat. "I had an idea," he said softly. "It may not be ethical, but something's got to be done. Medical matters like quarantine shouldn't be left up to political forces."

"What's your idea, doctor?"

"Well, suppose one of the men were to get really sick. Not enough to hurt him; just enough to be convincing."

"You'd inoculate him yourself, you mean?"

"Something like that."

Zavacki thought about it for a full second before he shook his head. "That's out. It would be an Earth disease. It would have to be a disease we could cure or we wouldn't dare give it to anyone. If it can be cured, it isn't dangerous. No, doctor, it's got to be something

that will scare the pants off everyone."

"I had another objection," Fleishmann admitted. "What if, by chance, I picked a man who actually did have something wrong? That would be a fine mixup."

"Yeah. I'm afraid we can't use it."

Fleishmann's shoulders seemed to sag a little. "I'm afraid you're right. That doesn't give us much of a chance, does it?"

"I don't know," Zavacki said thoughtfully. "I think you've given me an idea. Let me stew on it a while, and I'll see what I come up with."

Fleishmann nodded and cut off. Zavacki sat and stewed.

Why don't I just give the whole thing up? I can't fight City Hall. That's not my kind of politics, anyhow. Whatever gave me the idea I could handle anything this big?

Something whispered in his ear: *Give it up. In a couple of months, you'll be back on Earth—with Jen. She'd never know you'd given up.*

He lifted his head and looked levelly into the hazel eyes of Jen's picture on his desk and said aloud: "No. She'd never know. But I would."

He stood up, walked into his bedroom, and looked at himself in the mirror. "Zavacki," he said to himself. "You've got something simmering inside that feeble mind of yours. What is it?" When there was no answer, he said: "O.K., then; figure it out. Work on it. Think, man, *think!* THINK!"

"Night" and "day" are relative terms on Luna. The sun rises and sets once a month; two weeks of daylight, two weeks of night. A human being can't eat and sleep by the sun when he's on Luna.

Earth isn't any better. It stays in practically the same spot in the sky, and when it's clearly visible, undimmed by the bright glare of the sun, it is always broad daylight on the visible part of the planet.

So Man ignores the stars and is left to his own devices. Clocks. Nice, familiar, old-fashioned twenty-four hour clocks, all set arbitrarily to indicate the same hour as the clocks in the little town of Greenwich, England. There are no time zones on Luna. Why should there be? What would be the purpose in it? When it's midnight in Greenwich, it's midnight on the moon—all over the moon.

When Alex Zavacki woke up at midnight that night, therefore, it is not to be supposed that the darkness was due to the clock. The sun had been creeping below the horizon for two days.

He sat up in bed, aware that something had jarred him from his sleep. What it was, he couldn't be sure, but he knew it was something unusual. He switched on the lights and prowled around his apartment. Nothing seemed to be wrong. What had it been? He felt vaguely uneasy, but he couldn't place exactly what it was that was disturbing him.

He walked over to his window and looked out. At first, he saw

nothing unusual. The area was illuminated by brilliant lights; high above them loomed the ever-present Earth, set in a sprinkling of diamond-bright, unblinking stars.

And then he saw the commotion across the compound.

Spacesuited men were coming out of an air lock, hurrying toward a brightly-lit apartment window. And then he saw the havoc that had been created. The window was broken! Something had smashed the whole window out, ripped out a one-inch slab of welded transite!

The spacesuited figures were running toward the hole, from which little puffs of vapor still occasionally expanded into nothingness.

Somehow, Zavacki had always thought that no one lived in that apartment. The window had been polarized, night and day, ever since he had been in quarantine. He realized then that he didn't know where any of the men lived. What was the use of knowing? He could not go there; he could only contact them by solidiphone.

He ran to the solidiphone and tried to contact Baedecker. No dice. Either Baedecker wasn't there or there was something wrong with the solidiphone circuits.

He ran back to the window to watch.

Whatever had smashed the window in the other apartment had left a good big hole. The air inside had, of course, roared out with hurricane force. As far as he could tell, the interior of the apartment was a

shambles; furniture had been blown over and smashed by the brief wind, and several articles had been carried out through the hole.

A moon-jeep pulled up, followed by another. There was so much milling around that Zavacki couldn't tell what was happening. Some of the spacesuited figures were clearing away debris. A couple of them brought something out of the apartment and loaded it into one of the jeeps. Zavacki thought it was a human figure, but he couldn't be sure.

He had never felt so helpless in his life. He was sealed into the apartment; there was no way to get out. His solidiphone wasn't working—

Ping! He turned and ran for the solidiphone.

It was Baedecker.

"Deck! What happened? What's going on out there?" Zavacki waved toward the window.

"Raoul Jackson," said Baedecker. His voice sounded like a hoarse growl. "I just got the report. He evidently looked right down the muzzle of that heat gun of his and burned his head off. The energy of the thing was enough to melt the transite window, and the air blew. That's all we know so far."

Zavacki felt sick inside. He hadn't known Raoul well, but it didn't seem like a pleasant way to die.

"Suicide or accident?" he asked.

Baedecker spread his hands. "Don't know yet. They're taking the body into isolation surgery. The men

had to go in through the window; air pressure was keeping the door shut." Something buzzed from Baedecker's end of the circuit. He turned to look at something out of range of his pickups, then looked back at Zavacki. "More calls. I'll let you know."

Zavacki went into the kitchen and made himself a pot of coffee. Suicide or accident? Zavacki was ready to bet it was suicide. He sat in the kitchen, sipping black coffee, trying to get the thing straight in his mind.

Why would Raoul kill himself? It was obvious. Raoul had hated himself all his life because of the way he looked. Then he'd had a taste of what it would be like to look like a normal human being. When he saw that it wasn't permanent—that he would look like his old self again shortly—he had taken the fast way out.

What repercussions would it cause? What would happen?

By the time he had thought it out clear to the end, Zavacki had finished his first pot of coffee and started on his second. Then—and only then—he swung into action.

His first call was to Jack Wessler. His second was to Dr. Fleishmann. The third was long distance to Earth.

It was eight in the evening in New Orleans when Jennifer Sterling got the call. She had just put her hair into a pony tail when she heard the chime. She pulled her pink satin

robe around her, and went to the solidiphone desk.

When Alex's image formed, he started talking immediately.

"Jen! Gee, you look wonderful. Look; I think I've got it. If I don't, I never will; it'll be too late."

"Alex! Slow down. What are you talking about?"

He told her what had happened to Raoul.

"How horrible! No wonder he became an explorer." She held one trembling hand over her mouth.

"Yeah, but that's not all of it; I also found out that our pal O'Dowd was going to subpoena him to appear before the Spatial Exploration Subcommittee. That was the straw that broke the camel's back, as it were. O'Dowd was also minimizing the importance of what was wrong with Raoul, if anything. Now that he's dead, there's going to be an investigation, and you can bet your fuzzy white hat on that.

"There will be hints of murder. If the whole thing was a frame-up, Raoul would have to be done away with—drastically.

"Now, here's what I want you to do. There's one man up here who knew Raoul better than anyone else. He also has a good reason to want to get home before too long. I won't tell you who it is, because the less you know, the more O'Dowd will have to dig for his own information, and the more he'll believe it.

"I want you to suggest that he find out who this man is and subpoena him. Got that?"

"Yes, but—"

"Fine. I'll call you back." And he was gone.

Jen sat there for a moment, still feeling a little dizzy from the hurriedness of the call. Then she shrugged and began to dress again.

Again O'Dowd bit—harder, this time. It didn't take more than a week to find out that Jack Wessler was one of Raoul's best friends—if Raoul could ever have been said to have any friends.

By that time, the Congressional investigation was in full swing. Raoul Jackson's death had rocked everyone back on their heels. No one was subpoenaed right away, but the World Criminal Investigation Division sent a squad of men to Lunar Quarantine to investigate. The WCID men who were stationed at Lunar Quarantine gave their findings to the new squad, and they all went over the whole business again.

While O'Dowd was pulling his own strings, Zavacki managed to get some news from Baedecker.

"From all evidence, the company behind O'Dowd is the Interplanetary Engineering Company of North America—the boys who make our spaceships. The higher echelons of the corporation want to open up interstellar space the way Mars and Venus were opened up. If they can get plenty of colonies planted and start real interstellar trade in the next few years, they can make billions out of building interstellar vessels. They want to start mass pro-

ducing them, not doing them individually, by commission."

"Sounds pretty solid," Zavacki said. "If they get this bill enacted as a wedge, they'll have the whole structure of the law twisted to suit them within another ten years."

"That's right. No other company's equipped to build those big babies. Why should they be? We only buy one every seven years or so."

Baedecker was talking just to hear his mouth go. He was still scared pink. Zavacki could see it in every move of his fingers, in every twitch of his balloonlike face.

"By the way," he went on. "O'Dowd's secretary called again an hour ago; said that Jack Wessler's solidiphone was still cut off. I told him what you told me to—the solidiphone is still out of order—technical difficulties. He practically accused me of lying—trying to keep Jack from talking." He chuckled, but his heart wasn't in it.

"Good. Keep it up, Deck. I want O'Dowd to subpoena Jack before we let him talk to him."

"What . . . what if they subpoena me?" There was a faint strangled note in his voice. If Wessler was called before the Congress, he still had the protection of law; he could not be taken from Luna. He could appear by solidiphone. Baedecker had no such protection; he would have to appear in person. And that meant going to Earth.

"They won't slap a summons on you unless they slap one on Jack, too," Zavacki told him. "They don't

want you; they want him. Dr. Fleishmann can cover for you—say you're too ill to make the trip—until after Jack testifies. After that, you won't be wanted."

Baedecker relaxed—just a little. "I hope you're right, Alex." He paused. "Well, I guess there's nothing else."

"If there is, let me know."

"I will. See you later."

Men like O'Dowd, Zavacki thought, would never understand men like Baedecker or Jackson or Wessler—or even Zavacki.

Heroes? Sure. But most people never understood what a hero is. A job has to be done; a man sees and understands *why* it has to be done; he does it to the best of his ability. He's a hero if it's a dangerous job and has a little glory and fame attached to it.

What if he enjoys the job—really gets a kick out of it? Why, then he's a swashbuckler. A man's man. A *real* hero. A man who walks smiling into danger. A stupid fool. There were some of those who had become Primary Explorers; they were the ones whose ships had come back empty. A man who enjoys danger, a man without caution, dies easily because he never knows when to stop.

Not all of them had been killed; some had come back. But most of them couldn't stand the isolation in quarantine. A man who enjoys danger can't stand the womblike security of a quarantine station. They crack

up or they try to escape. And to attempt to escape from Lunar Quarantine was punishable by death. It had to be.

No, a good Primary Explorer, the kind that went out, trip after trip, was a lonely man who liked to be alone. He was willing to risk his neck just to be left alone.

Some were different. Zavacki had his linguistic studies; Wessler had his ambitious colonization project. But these were one-shot men; they were willing to risk everything—once. A man who made one trip and came back alive and healthy had a nice pile of cash waiting for him



when he got out of quarantine. But there weren't many like that.

Primary Exploration was a tough job. If a man died on a planet, another Primary had to be sent out. One of the planets of Mizar had been named Hell because ten men had landed on it, none had come back. And yet, number eleven was ready to go. It had to be done, and men did it—but not just any men.

And O'Dowd could not understand that. He could no more have understood, basically, that kind of thinking than Raoul Jackson could ever understand why a man would want to make a speech in public.

Raoul's lack of understanding was extreme, and it had killed him in the end. But O'Dowd's lack was just as bad, and it was going to trip him up eventually.

A lack of sympathy is sometimes useful in a fight; a lack of understanding is nearly always disastrous, one way or another.

And one of the things that O'Dowd didn't understand was that most of these men *liked* their five-year quarantine.

O'Dowd's Subcommittee finally slapped a subpoena on Jack Wessler. There were several others, too, but they were just camouflage; Wessler was the man he wanted. Baedecker didn't get one, but he wasn't out of the soup yet.

The first ones to be interviewed were the WCID men. The interrogation wasn't broadcast, but reporters

were present, and Zavacki read the news as soon as it came in.

It was established that no one else but Jackson could have been in the apartment at the time of his death. It was established that Raoul had been working on the heat beam for four years. It had been tested by the WCID, and had been definitely identified as the death weapon. It wasn't as powerful by far as Raoul had wanted it, but it still had plenty of energy to throw.

The medical report had been read into the minutes. Raoul Jackson's head had been completely destroyed by the beam; the neck had been charred badly enough to prevent bleeding. The cadaver had been absolutely identified by fingerprints.

Was the wound self-inflicted purposely or accidentally? There was no definite evidence.

Raoul's peculiar pigmentation was discussed thoroughly, but inconclusively. The evidence was too conflicting.

It wasn't until the second week of the investigation that solidiphone connections were made so that Jack Wessler could be brought to testify. Zavacki had had some special cables run into his own apartment from Wessler's, so that he could watch without being seen.

Mr. John Abel Wessler, Primary Explorer for the Space Exploration and Colonization Administration, was "called to the witness stand." He identified himself and was sworn in.

After a few minor preliminary questions from other members of the Subcommittee (O'Dowd preferred to let the others start the ball rolling), Delegate O'Dowd said:

"Mr. Wessler, I understand you knew the deceased. Is that correct?"

"That's correct, Mr. Delegate. I suppose I knew him as well as anyone could."

"I see." O'Dowd settled himself back comfortably. "Is there any reason, in your opinion, why Mr. Jackson might have chosen to take his own life?"

Jack's brow furrowed. "Well, I wouldn't like to say. It'd only be an opinion . . . and I'm under oath . . . and—"

Delegate Vegler, a tall, lean, graying man with the air of a lawyer, said: "Please remember, Mr. Wessler; this is not a court of law. We are not here to pass sentence on anyone, but to determine what changes, if any, in law should be recommended to the Congress. Your opinions, as such, are perfectly permissible."

Wessler nodded. "O.K., then. It's my opinion that he killed himself rather than die of the disease he had."

There was a moment's silence from the delegates and a faint murmur from the reporters, who were out of pickup range.

Then O'Dowd leaned forward and said: "It has not been established that the deceased had any disease."

"I know," said Wessler. "At least

the cause of it had not been discovered, to my knowledge." (This was perfectly true; Wessler hadn't heard about the oscillating force field.)

"But he did say that his skin condition was very painful to him."

"Do you think it's normal for a man to kill himself in fear of an unknown, possibly nonexistent disease?" one of the other delegates asked.

"I don't know," said Wessler. "I certainly wouldn't, but, then, mine isn't painful."

"Yours?" It was O'Dowd. "Your what?"

"What you just said; an unknown, possibly nonexistent disease."

"You don't look like a sick man, Mr. Wessler."

"I'm not; I feel perfectly fine."

O'Dowd frowned and shuffled through some papers on his desk while Delegate Vegler said: "Just what is this disease, Mr. Wessler?"

"It doesn't have a name yet."

O'Dowd found the paper he was looking for. "Mr. Wessler, this is rather ridiculous. As I understand it, your wife and three daughters live with you in quarantine. This is unusual, but not unheard of. Tell me, do any of them feel ill? Do they have the disease?"

"No, they feel fine. If the doctors are right, they couldn't get the disease anyway."

O'Dowd snorted. "It hardly seems that a noncommunicable disease which causes no discomfort to someone who has it can properly be called

a disease. Just what is the medical theory on this dreadful malady?"

"I'm not a medical man, Mr. Delegate; I don't understand it completely. But, as I understand it, it is communicable only between human males, and prevents the conception or birth of male offspring. I only have girls, you know."

"Let me get this straight," said another delegate. "You say this disease you have, if it spread, would keep any man who had it from having boy babies?"

"That's it, yes sir."

There was general low conversation around the delegates' table. O'Dowd looked at Wessler with an expressionless face before he began speaking in low tones to Vegler.

It had happened. They'd been suckered in. They'd have to go on with this phase of the investigation; the reporters wouldn't let them break it off at this point.

Finally, O'Dowd said: "In view of the fact that this is properly a medical situation, we will adjourn until tomorrow, at which time, medical experts will be here to discuss this problem." He hated to say it. He knew he was walking into the situation blind. But there was nothing else he could do.

In a few short minutes, the aim of the investigation had been twisted aside. The death of Raoul Jackson was no longer important.

In his apartment on Luna, Alex Zavacki took another swallow of hot, black coffee. He still felt tense; it wasn't over yet, by any means.

The newsfax hit it up big. Headlines in the dozen official languages of Earth were shouted out across the face of the globe. People read about the "Mysterious Extraterrestrial Malady" and worried. What would the doctors say?

Dr. Fleishmann was asked to come to Earth. He took the shuttle without waiting for a subpoena. He brought with him a sheaf of papers that he and his assistants had spent days in working out.

The Subcommittee called in Dr. Nathan Preston, head of the Department of World Health, and his assistant, Dr. Krishna Chang.

There was a faint note of tension in the air when Jack Wessler's image appeared in the solidiphone.

The first witness called was Dr. Preston. He was a stocky, well-built man with iron-gray hair and an air of determination and competency.

After the preliminaries, Delegate O'Dowd said: "Dr. Preston, I understand that Dr. Fleishmann of the SEACA has given you some documents, which you and Dr. Chang have read."

"That's true, Mr. Delegate."

"And these documents relate to what?" There was definite tenseness in O'Dowd's voice, although his face appeared as relaxed as ever.

"They are in relation to a medical theory to explain the so-called disease reported to this committee by Mr. John Wessler. However, rather than explain it myself, I would like to ask Dr. Fleishmann a few questions, if I may."

O'Dowd's tension seemed to relax a little. "Certainly. Dr. Fleishmann has agreed to answer any questions. If you will, Dr. Fleishmann?"

Fleishmann took the stand.

"Go ahead, Dr. Preston," said O'Dowd.

"As I understand it, Dr. Fleishmann," Preston began, "you propose that such a disease might be caused by a virus which is structurally similar to the Y-chromosome of the human male. Would you explain this to the committee, please?"

Fleishmann cleared his throat with a dry cough. "Yes. Sex is determined in human beings by two chromosomes—the heredity units that make up the nucleus of the cells. These are called X and Y chromosomes. The X is recessive, and the Y is dominant. If a human being has two X chromosomes, that human being will be female; if there is an X and a Y, he will be a male."

"What if there are two Y's?" asked one of the delegates.

Fleishmann looked disgusted. "Impossible. When the sex cells split in the reproductive organs, the chromosomes are divided. A female ovum can only contain X, since that's all there were to begin with. Male spermatazoa can contain either an X or a Y. If a Y unites with an ovum, the result will be a male child; if an X unites with it, the result will be female. Since there can be no Y ova, such a thing as a Y-Y individual is impossible."

"Oh," said the delegate.

"Now, to explain the virus theory, I'll have to back up a little bit," Fleishmann continued. "It has been known for a hundred and fifty years that one of the best methods of killing any organism is to give it a fatal delusion."

"Some of our oldest drugs—sulfanilamide, sulfathiazole, and others—do just this. The molecules of those drugs are structurally similar to certain chemicals that many bacteria need to survive. Because of this similarity, the bacterium is 'fooled' into accepting the drug instead of the proper chemical that is necessary for its continued living—or *it's reproduction*."

"In other words," Dr. Preston said smoothly, "some of these drugs don't kill the bacterium, they simply inhibit its reproductive abilities."

"That is correct."

Preston turned to the delegates. "May I emphasize, gentlemen, that this has been shown to be the case. Modern application of this principle is responsible for many of our best chemotherapeutical processes." He turned back to Fleishmann. "Go on, doctor."

"Well, now, what is a virus? It is a complex chemical, a protein that is, in many ways, similar to certain protein substances in the cells of its host—whatever that may be."

"Now, we believe that this virus—which we call Virus Y—is structurally similar to the Y chromosome of the human male. It is capable of usurping—taking the place of the

Y chromosome in the spermatozoön, thus rendering that particular sperm incapable of fertilizing the female ovum. It has no effect on the X chromosome, and therefore cannot have any effect on nor be carried by a female. It is in no sense a venereal disease." He looked at his fingernails for a moment, then looked up at the delegates. "However, no male who has the disease would be capable of having male children."

Delegate Vegler said: "Have you isolated this virus yet, Dr. Fleishmann?"

"No. Even with modern techniques, it is impossible to check on a virus positively unless suitable test animals are available to check the reaction of the virus."

Preston looked at him with a faint smile on his face. "Would you explain to the committee why no test animals are available?"

"Because none of them will volunteer," Fleishmann said testily. "The only possible test animal is the human male."

O'Dowd had been sitting at his desk, scowling, running his fingers along the line of his blue jaw.

"Now, just a minute," he said, "you have a theory which might be an explanation for a disease that we can't even be sure exists. As far as I can see, the only symptom is the fact that Mr. Wessler has not had any male children."

"That is a sign, not a symptom," Fleishmann said. "But I understand what you mean. Yes, that is perfectly

true. We have very little to go on."

O'Dowd snorted and turned to Dr. Preston. "Does this make sense to you, doctor?"

Preston paused a moment, then nodded slowly. "It does. I would hesitate to make any flat statement about the man's health until further research is done, but I think that Dr. Fleishmann's theory is at least a lead in the right direction."

"I concur with Dr. Preston," Dr. Chang interrupted.

O'Dowd looked slightly purple. "But thousands of men have had only daughters or only sons—or even no children at all. Nobody ever accused them of having some mysterious disease."

"That's true," said Fleishmann. "However, none of them had been to an alien planet, either. Tell me, Mr. Delegate, would you dare take the chance of releasing this man to society?" And he pointed a slender finger at Jack Wessler.

O'Dowd glanced involuntarily at the image in the solidiphone. He made no answer, but it was written all over his face.

It was another twenty-four hours before Jennifer called Zavacki.

"The results are coming in now," she said. "There's no doubt about it now. Over eighty-five per cent of the population is violently against the passage of the O'Dowd bill."

Alex Zavacki looked haggard, but he managed a smile.

"Sure," he said. "We hit 'em where they hurt. To any single in-

dividual, such an affliction wouldn't hurt a thing. But if everybody caught it, there wouldn't be any human race within a century. Unless you girls got together and developed parthenogenesis."

Jennifer winced. "God forbid." Then she said: "But that's an awful thing! What a terrible thing for Mr. Wessler to have."

With that, Zavacki burst into laughter. "Good! It worked on you, too!"

"Alex! What do you mean?"

"Honey, that theory has holes in it you could toss a tiger through. For instance, how would such a virus evolve? If the only possible host is the human male, how could it have a host on a planet where there are no human males?"

"And you mean none of those doctors spotted that?"

Zavacki's smile became grim. "Delegate O'Dowd is a man without ethics and without honesty. Since he has neither, he thinks they're the same thing."

"He figured we were pulling something on him; he assumed that Fleishmann had a cockeyed theory. So he got the best doctors on Earth to listen to the theory."

"You see, hon, he assumed that because Preston and Chang were ethical, they must be honest, and he knew they'd be smart enough to spot any holes in Fleishmann's theory."

"Your theory, you mean," Jennifer interrupted.

"Partly. I got the basic idea, but

it was Fleishmann and his boys who filled in the holes.

"Anyway, O'Dowd's mistake was in assuming that Preston would side with him."

"Preston and Chang know what the score is. They know that O'Dowd's bill is . . . was . . . dangerous. O'Dowd was trapped. An incompetent medic would have been fooled by Fleishmann's theory. A competent one would go along with it. Six one way and half a dozen the other."

"There is a higher ethic than immediate truth; there is long-range truth. And that's what we were going on."

"But if O'Dowd and Interplanetary Engineering are unethical, won't they try again, some other way?"

"Possibly. But not very soon. And within ten years, three new planets will open wide for colonization. That's enough to take care of everyone, and IECA can start building interstellar liners, which should satisfy them. Although I do think we ought to see that some of the other companies get a finger in the pie."

Jennifer looked at him for a long moment, then: "You're wonderful, Alex. You know that?"

He grinned a little. "So are you. What do you want for Christmas?"

"Christmas? Good heavens! I hadn't realized—"

"Creeps up on you, doesn't it?"

"Uh-huh. I guess it'll be a pretty Merry Christmas."

"Yeah," he said. "Even Baedeker will be happy."

"What about the Wesslers? They can't come back to Earth now—not even when the five years are up."

"They never wanted to. They want to colonize; Jack's just that kind. Me, I want to come back—to you."

They talked a few minutes more, but neither of them could stand the strain at that point.

When they cut off, Jennifer Sterling buried her face in her hands and cried.

Alex Zavacki, a quarter of a million miles away, was doing exactly the same thing.

THE END

IN TIMES TO COME

Next month the lead-off story is "Ribbon in the Sky," by Murray Leinster. (Incidentally, in this month's "What's Eating You?" you'll find mention of "Leinster projectors." Garrett ain't kiddin', either! You should see the cockeyed things Leinster can do with his incredible, optically-impossible-everybody-knows projector! Leinster is one of the authors who has been reading and writing science fiction so long now he believes it himself . . . and makes it work! He's got a patent on it.) The story is another of the Med Corps series—and expresses the ancient problem of xenophobia among small, isolated groups. But . . . with a background thought that makes the most fanatical xenophobia make good, understandable sense!

Also coming is Eric Frank Russell's article "And Still It Moves." This concerns the thoroughly incredible Eustasia Palladino, an unmanageable moron, with a genius for making a monkey's uncle out of the law of gravity. Having been dropped on her head as a baby, her wits were, apparently, slightly scrambled—but she compensated by scrambling the laws of Nature. A most uncharming overage juvenile delinquent in most respects, her story makes real reading fun.

THE EDITOR.

SOMETHING IN THE SKY

If you look, and there's nothing there, if you can't feel it, and radar can't see it, obviously there's nothing there. Unless you have some other, and more ultimately fundamental sensing system. . . .

BY LEE CORREY

Illustrated by van Dongen

Something watched from the sky. Something watched as it had for a long time. Unseen and unheard, its superior intelligence managed to counter all new detection methods. Occasionally, it made itself evident in the sky for reasons unknown and unfathomable.

Because invisibility was protection, it was untouchable . . . until the application of a basic, all-embracing law of the universe was brought to bear upon it . . . accidentally.

"MORE FLYING SAUCERS SIGHTED!"

"In the wake of another rash of flying-saucer sightings near Des



Moines and Dallas, spokesmen for the government further confused an already confused issue by refusing to comment upon the strange objects which have once again appeared in the sky to be seen by millions . . ."

"What do you think, Pete?" asked George Humboldt as he handed the morning newspaper to his boss. "Are they real this time?"

Peter Remny put on his glasses and studied the headlines carefully in the same manner he studied everything. He did not read further than the first sentence.

As field-test conductor for Great Western Aviation's secret Mentor antiaircraft guided missile, Pete was cleared for Top Secret; the most discreet information of the government's technical work was available to him. He also possessed an AEC clearance. Part of his job was to know what was going on in the fields of guided missiles and warplanes. The two fields interlocked so closely when it came to surface-to-air guided interceptors that they were almost indistinguishable.

He knew that in this year of 1962 no aircraft or missile existed which could perform in the manner of the saucers. He knew the state of the art was such that the mysterious objects could not be real.

"Bosh!" he told his assistant. "Flying saucers again! You can almost predict it, George. Along comes the middle of summer—the 'silly season'—and people start seeing things again . . . just as they have since 1946."

"Hallucinations, then, eh? How about some project we don't know of?"

"Do you know of one?" George was cleared for "the works," too.

"Uh . . . no," George replied after thinking for a moment. "But how about . . . uh . . . across the Pole, Pete?"

"Do you ever read the Central Intelligence reports that funnel through here?" Pete asked.

"Yeah." George thought a moment longer, then started to say something. But he didn't.

Pete noticed it. "What were you about to ask? If I thought they might be Martians or Venusians—or some such nonsense?"

"Yeah—"

"Don't be ridiculous! You've been seeing too many movies lately, George," Pete told him sharply, taking off his glasses and slipping them into their case. He tossed the paper back to his assistant. "Little green men! Visitors from outer space! Bah! George, you should be intelligent enough to see when somebody is trying to make the headlines, trying to get publicity." He stood up, his lanky form towering over his desk. "In the summer, the weather over the country is, in general, pretty clear. People are outside more. They look up and they see things—high-flying jets, stratosphere balloons, the planet Venus, and other natural or man-made objects. Hell, the sky is full of things these days—man-made things. Look at how hard we have to fight to get on the range schedule

... and this range is only a few thousand square miles, yet there are planes and missiles and balloons and junk in the sky constantly." He stepped over to the window and peered out at the beautiful blue of the still New Mexico morning sky. The air was perfectly clear over White Sands; he could see the far Sacramento Mountains fifty miles away. "Weather looks good this morning," he went on, changing the subject. "Have they still got us scheduled for 1100 hours firing time?"

George dropped his paper to his desk and swung to see the teletype. "Yup! Schedule check just came through from Range Control. Drone takeoff at 1000 hours, firing time 1100. They made one small change in radar frequencies; a bind with another project."

"O.K., get the weather forecast while I dig up the truck. If we're going to get our bird off the ground this morning, we'll have to get cranked up pretty quick." He grabbed a phone, dialed, and got a busy signal. Nervously, he slammed the receiver back in its cradle. "These lines are always busy! Why can't they put in more phones?"

"How come you're worried about this missile, chief? You've followed #16 all the way through the ground checks," George observed.

"You'd be worried too if you had to account to Garson every time a shoot fails—and we've been having too many failures lately." He didn't tell his assistant that he was particu-

larly worried about Mentor missile #16. If something went wrong this time, the axe would fall for certain. Garson, back at the plant, was a hard man to deal with.

The antiaircraft missile in Pete's care was the most perfect guided missile ever designed. Years of long, hard experience with rockets and guided missiles had provided background for the men who built her at Great Western Aviation. They had used tried and proven practices with the Mentor. The missile's reliability was beyond reproach. The system was a perfect device.

Yet it had failed. The first ten missiles had performed beyond expectations. The last five had failed miserably. The Mentor was a "technician's hell."

The men who were working on it were beginning to hate it—a hate born of distrust and frustration. Everything in the missile was perfect. The various components which made up the missile system were perfect. Together, they *should* function properly—but they didn't. Nobody knew why.

Pete often suspected the one gadget which was unusual: the guidance and homing mechanism. That device was totally new—and top secret. It did not depend upon radar, infrared, or light. In fact, it did not depend on *any* electromagnetic radiation. The Mentor had a mass detector which steered it. Pete did not understand the mass detector completely. He knew it somehow detected the

presence of mass—a plane—by the effect of Einsteinian bending of space. Einstein speculated back in 1906 that mass distorts space by its presence, causing gravity and also bending light. Astronomers proved it with an eclipse of the sun. Other men took the theories and, after they had worked with them for years and after tiny electronic parts and circuits had been developed, came up with a device which could detect the presence of mass. The Mentor "saw" by means of this. There was no way it could be jammed. The mass detector was part of the perfect anti-aircraft missile.

But the mass detector worked. There was no question about it. Facts were forcing Pete to discard his suspicions.

There was no place to lay the blame . . . except on human beings. And Garson was putting the blame on Pete. After all, the test conductor was in charge; any malfunction *had* to be the result of an oversight in the checks—or so reasoned Pete's boss.

Pete had one more chance. He hadn't slept for days. His stomach was giving him more trouble than usual. He had lived with Mentor #16 ever since it had arrived at White Sands.

"Drone is approaching Point Prep!" the range intercom announced softly.

The firing blockhouse was a bedlam of purposeful confusion. Men were working over equipment,

peering at oscilloscopes, measuring the wiggling lines on charts, or talking—always talking.

"Coming up on X-minus three minutes!"

"Jake, have you made your three-point calibration?"

"Attention, firing panel! No wind correction!"

"Mentor Project, this is Range Control. You are in the green on optics."

"No, no! Leaving the time signal as it is!"

Pete was everywhere, making certain that all pre-flight operations had been satisfactorily completed. He followed every operation personally where he could. Outside, the Mentor #16 sat quietly on its launcher, its iridescent red skin almost too bright to look at. Pete glanced out the thick windows again. He *knew* that sleek missile was in perfect condition. It had to go right this time.

"Drone is at Point Zebra!"

Overhead in the blue New Mexico sky, a QB-47 drone jet bomber was sweeping down from the north, approaching the point where the Mentor would rise to intercept it and blow it out of the sky. It was unmanned. Two director planes flew with it.

Finally taking his position next to the firing panel, he asked George, "How does it look?"

"Good. Optics in the clear. Not a bit of haze in the intercept area."

"Radar?"

"Safety radar is on the drone and

waiting for the missile to take off."

"Range?"

"Range is clear. The director aircraft are breaking for the range boundaries now. Ground control has the drone."

"This is Mentor Project!" another man announced into a microphone, his eyes on the clock. "Coming up on X-minus sixty seconds. . . . Mark! X-minus sixty seconds!"

The great rocket range of White Sands was ready to go. Up and down the long tract of land, men were peering through tracking telescopes, watching the skies with radar, and standing by telemetering equipment. Radars searched the skies, finding only the lone drone. Road blocks were up on the highways which crossed the range. The safety men were casually watching their radar plots, their fingers on the switches which would bring down the missile if it went wild.

"Thirty seconds!"

"Mentor Project, this is Range Control. You are in the green!"

"Ready to fire," George announced calmly.

Pete took a key out of his pocket and inserted it in the firing panel. George turned it, arming the firing circuit. "Board is green!" George snapped.

"Fire at will!"

"Ten seconds . . . five . . . four . . . three . . . two . . . one—"

Wboom! The Mentor was gone, streaking off into the sky as the firing switch was closed. It disappeared from Pete's view in the blockhouse

windows, leaving only a cloud of brown dust. Ducking through the barrier ropes around the firing panel, Pete dashed over to where the missile was sending back information about itself by means of radio telemetering. He watched the glowing dots bounce around on the oscilloscope screen.

"Missile has stabilized. End of boost phase!" somebody shouted.

"Detector has gone into acquisition," came another call. "It's searching for its target now!"

"Mentor Project, this is Safety. You are right in the groove. Missile is going up the center of the range!"

Pete felt a fine glow of elation. Missile #16 was going to be successful.

Then: "Missile is in a tight turn to the east!"

"What the hell . . . ? *Two* acquisition signals . . . ! There! It acquired! It's locked on! It's homing! Go, bird, go!"

"Go after it, baby!"

"Signal is solid! It's homing right in!"

"Mentor Project, this is Safety! Your bird is not homing on the drone! It's going toward the east boundary up-range. If it gets too close, we'll have to chop it down!"

Pete grabbed a mike. "This is Mentor. What target does it have?"

"No target. Drone directors are down-range. Radar sees no target up-range."

"Coming up on intercept!" cried a man from the telemetering racks. "There's the fuze arming signal!"

There's detonation! No signals on telemetering!"

"Radar beacon is out!"

"Drone is at intercept and still flying!"

"This is radar! The missile came nowhere near the drone!"

George was at his side. "What happened? Why did it break from the drone? What did it home on?"

Pete didn't know. Missile #16 had suddenly and unpredictably become a total failure. He dropped the mike and walked disconsolately out into the brilliant sunshine.

What had gone wrong this time? The telemetering had shown the missile was homing on something. But nothing was there. What was he going to tell Garson now?

Hours later, he was still asking questions as he stooped over the long table in his office where the telemetering records had been spread out.

"Everything performed beautifully," George said, measuring the traces with a pair of dividers.

"Except it dropped acquisition on the drone and took off on its own!" Pete said desperately.

"Somebody once said this bird was guided by a brain. They were right; it has a mind of its own," the young engineer remarked. He peered at a set of traces. "Dan had the phasing right on the nose. If it hadn't worked right up there, these would show it. What philosophy do you suggest at this moment, Pete? It homed, got fuze signal, and blew.

Was it a success—or a failure? Everything worked."

"Look, you young squirt!" Pete said, irritated. "It was a failure! We have some telemetering data; it tells us nothing. We have radar plots; they tell us where it went. Optics lost it when it made the quick turn. And the drone flew home."

"It could have been worse," George pointed out. "Garson could have been here. Or we might have had a congressional party watching."

"Thank God we had neither!"

George was rolling up the telemetering charts. "I'd better take these down to the reduction group. They've been screaming for them for the past hour."

"Go ahead," Pete mumbled, "I'm through with them." He also realized he was through as Great Western's test conductor.

No, he decided. He would fight if he had to. Something *drastic* had gone wrong with #16; he would find out what. He would have to stand up to Garson, but he would look into every possibility. It was more than his job, now. He felt compelled to find out *what* had happened. It didn't look right.

There was a knock on the door. "Come in!"

The Army captain in charge of the recovery party sidled carefully through the door. He had a large cloth laundry bag with him.

"Hi, Bernie! Did you have any trouble finding the pieces?"

"Nope." The captain stepped up to the desk and set the sack on the

top. "We happened to be practically right underneath it. Recovered ninety per cent of the missile." He loosened the draw strings on the bag. "We also found some other things that *weren't* part of the missile."

Pete whirled and looked at what the captain had pulled out of the bag.

"As I said, we were right under it," the recovery man went on. "It hit something. I don't know what it was. I didn't see it. But pieces of this stuff fell all over the place."

The chunks of metal had a strange, pearly sheen to them. Pete had never seen metal like that before. The surfaces were as smooth as machinist's Jo-blocks; where they had been broken by the warhead explosion, they exhibited a queer, crystalline structure totally unlike any other metal. He saw something that looked like a component part. Picking it up, he discovered it to be deceptively light. Carefully, he studied it.

It was a part from—something.

Pete was cleared for the highest technological secrets of the land. He knew what was presently under development.

The metal and the part were of no technology he recognized.

Later, he sat quietly in the dark of his office, watching the strange pieces glow with a dull red light.

The Mentor had hit something

nobody had seen. The Mentor had seen it. Neither radar nor optics had. The mass detector, relying on the basic laws of matter and space, had worked perfectly. Too perfectly.

Peter Remny was a practical, down-to-earth engineer. Fantastic reports of things in the sky never bothered him much—before. Now, he realized, it was a different matter.

He was not worried about the fact that some stray plane might have happened on the range. Nor was he worried about possible retaliation from any Earthbound nation. He had discarded those much earlier. Now he was waiting for retaliation from somewhere else.

And he was wondering what he was going to tell Garson, a man much harder to reason with than himself. In fact, what was he going to tell anybody?

Something still watched from the sky. It did not understand those below any more than those below might have understood it—had they known. But it now knew it was dealing with something which could not be dismissed lightly. No species with a knowledge of space and matter can be dismissed as primitive.

Had the time come, or would it continue to watch from its vantage points in the sky—vantage points which were no longer invulnerable?

Lacking a true understanding of the nature of mankind, it made its decision.

THE END



THE QUEEN'S MESSENGER

It took a very special kind of messenger, because the fact of being a messenger was, itself, enough to kill him. The man they picked had just the special talent needed....

BY JOHN J. McGUIRE

Illustrated by Freas

"Which one will he be?"

Dr. Gilbert Blanding, head of the Research Bureau, World Government Department of Agriculture, had been expecting that question.

His friend and occasional companion in research, Dr. Karl Gorski, had been a successful revolutionary against the Soviets. He was an expert at reaching for one thing and

grasping another. But even Karl's skill in planning had not prevented the deaths of three other men who had tried to carry their message to Mars.

"I took nineteen cards, added the joker, riffled and shuffled them," Gil said. "Cavendish came out as number nine."

"Sufficiently random," the old

Pole approved. "A good method, yes."

"But the man, no," Gilbert finished.

"No."

The flat finality in Gorski's tone angered Blanding. To Gil, knowing as well as could be known how many men Gorski had killed while a young patriot, the statement seemed utterly unreasonable.

"We will discuss Cavendish in a moment," Gorski continued. "Let us first complete the details on this one we just spoke with—"

"Clancy," said Blanding. "James Terence. Weight, 120. In for armed robbery. Caught, if I understand this record correctly, only because a cashier had more courage than good sense. Hobby, amateur magician. Has worked as a knife thrower—"

"You miss the essentials," Gorski's interruption was that of a chief surgeon instructing an interne. "First, he is a physical type that we are supposed to need. Second, he comes from the kitchen in this prison."

"For the same reason that you are taking that chef who tried to poison the political convention." Gil felt himself beginning to understand Karl's reasoning.

"Yes. You want one particular man, so we hide him by taking a dozen similar cases."

Gil responded to the stress Gorski had given the word *you*. "Karl, who else can do the job?"

"That is the unanswerable argu-

ment. But I would still prefer to let him stay in prison."

"Why? Because he was a murderer and killed his wife and her lover? And yet you are willing to take the chef who tried to poison an entire political convention. And yourself, how many have you killed? Ever think about them?"

"Almost every night, Gilbert. I can only hope that those I have saved since I began to practice my profession begins to cancel that number.

"And there is exactly, explicitly, why I do not like Dr. Cavendish. He took an oath to save human lives, yet he deliberately used his enormous medical skill to try to hide his crime."

"He convicted himself," Blanding argued.

"He did?" The old Pole was openly derisive. "How? The old man who was peeping in the window, the fact that the police 'copter was in the immediate neighborhood, the young policeman who had the hunch about putting the plug back into the drain—this is self-incrimination?"

"His book," Gilbert mumbled.

Gorski became abruptly more judicial in tone. "Yes, in that sense you are right. His own work on trace elements allowed the District Attorney to present proof positive that the liquid in the tub had been human beings. But enough of this. I cannot dispute your essential point."

"You mean—?" Gilbert could

not follow the sudden change in Karl's attitude.

"We need him. Maybe this time the end will justify the means. And one other little point—"

"Yes?"

"I think he is the proper man to match against that other murderer, Kushalik."

Frank Cavendish forced himself to sit calmly, await his turn without *open* impatience. Inwardly, he seethed. Although the routine of a prisoner's life was always at the disposal of the authorities, he had work to do, work which they knew was important. He should be over at the kitchen now, especially when half his crew had been called in for these interviews.

Well, there was nothing he could do about his kitchen or his sewage plant problems until this interview was over. So . . . he forced himself to think about the reason this group was assembled.

Something about dietary experiments on concentrates for Mars, the prison grapevine had said. And the grapevine in Jackson Prison—The Hermitage, some literate prisoner had dubbed it, because the men who came here were here to stay—was uncannily accurate.

Strange that they were still experimenting with concentrates though. The journals he received as a reward for good conduct, although barren of definite information, had implied to his trained mind the fact that the problem of feeding both

Earth and Mars had been whipped several years ago.

"Number nine."

Frank stood up and walked to his place between Garth and young Jones.

Interesting though the work might be, his answer was no. He himself had killed the only reason why life outside this maximum-security jail had ever been attractive.

The shadows from the barred window behind them fell across the desk they shared. The decision made, there was not much need to talk to each other. The silence was broken only by the snap of Gorski's lighter or the steamy breathing of Gil's pipe.

Too much silence in this place, thought Gil. Too much silence and too much grayness. There was not even a tiny click to the latch of the door when it opened to admit the two guards and the next prisoner. The steps of the trio were soundless on the bare floor.

The guards guided the prisoner to the chair in front of the desk, then moved to stand on either side of him. Gorski shook his head and Gil spoke for both: "We have permission to see all of them in private."

The older guard hesitated, said, "This one—"

Blanding motioned to the privilege-slip on the desk.

The guard shrugged his shoulders, motioned to his companion. They left as silently as they had come.

When the door had closed, Blanding stared openly at the man across the desk. The prisoner's attitude was puzzling. Not arrogant, not submissive, but—Gil groped for the word, found it — neutral, a sort of chameleon response to the gray walls and the silence.

Only once during those first few moments did the man in the salt and pepper uniform show a flicker of emotion. That came when the prisoner's glance touched upon a card, the summary of his life complete with number, picture and crime. With a raised eyebrow he looked at Gil. Hint of laughter, question clear but unspoken: *You* need this?

Karl stirred restlessly, his fingers drummed on the plexi-protected top of the desk. Blanding took a deep breath, began, "Dr. Gorski, may I present Dr. Frank Cavendish?"

"It is an honor to meet you in person. My most highly-prized and constantly-used book is still your 'Tables of Trace Element Variants in Common Dietary Changes.' The work was . . . how you could—" Gorski subsided, red-faced, regarding a corner of the room with embarrassed intentness.

The prisoner's attitude did not change nor did any gesture mar his attitude of patient waiting.

A minute dragged by before Gil realized that he must be the one to break the silence. "We need you, doctor. We need you desperately."

There was no response, not even

that of curiosity, in the face or body of the man opposite him, but Gil plugged on. "Not just we two who came here, not just this world, but the planets and worlds to come. They need something only you—"

Gil stopped, found his own glance following the prisoner's roving gaze. The yellow card, striped by the shadows of the barred window; the gray walls; deliberately, a long look back to the door behind which the guards waited. Suddenly, Blanding saw these things through the prisoner's eyes. In a swift surge of sympathy, he realized how empty his words had echoed in the hollowness of a prisoner's life. He turned to Gorski for help.

The help came from Cavendish. "Go ahead, doctors, but without the heroics, please. I know I owe you at least the courtesy of listening."

Gorski took over. "We have completed your work, Dr. Cavendish. We now have the total picture of the place of trace elements in the diet."

"Congratulations. I was fairly sure that you had done so. I am glad to learn my guess was correct."

Gorski heaved a gusty sigh. "We have also, I think, immortalized you. The series of equations are in your name."

"But that is as it should be. It was your expansion of the lock and key analogy, your experiments with the vitamin antagonists, which showed us the questions to ask."

ASTOUNDING SCIENCE FICTION

Knowing what we had to find out, the rest was almost automatic."

Cavendish, who had been leaning forward, now settled back to as much comfort as his straight chair allowed. "Thank you for the pleasant information, but I am sure that you did not come here just to cheer me up. Nor," and he looked at Gil, "do you have me here simply to ask me to be a guinea pig. What do you want?"

"I told you," said Gil. "We need your help."

"How? What help can I be? If your problem is theory, I can offer little. The journals have been too barren of information for me to keep up to date.

"And if it's a problem of application, you know as well as I that the answers are best found by research teams working on Mars itself. Not, I'm sure, in anything I can do or suggest."

"You are utterly wrong," contradicted Gorski flatly. "There is something very vital you can try to do, something three men have died attempting."

Cavendish suddenly leaned forward again, caught as Gil had seen a lazing trout fling itself at the right bait. The prisoner focused his attention on Gorski, then followed the direction of Karl's glance and fixed his eyes on Gil.

Gil began with a bitter pill. "You were among those who insisted on a long-term contract for those who wanted to settle on Mars."

"Yes, certainly, including the testing program to screen out the psychos—"

"That long-term program was a mistake."

The prisoner's face set in the stubborn lines that Gil knew so well. "How? You can't colonize with fly-by-nights. History has proven that a score of times. Real building is done with what we planned, people with families who really need the land. They stay, they have the reasons to stick out the first few bitter years."

Gorski shook his huge head. "But fly-by-nights also have a place in the scheme of things."

"Where?"

Gorski showed no impatience at the caustic tone. "We should have had a check on the colonists through people who came and went in days or months. Then the First Family would not have been such an agonizing error."

"Agonizing error." Cavendish rolled the words around his tongue like a man discovering a new flavor in an old and familiar drink.

"Our hydroponic diet was not complete or perfect," Gil began.

"Of course not. But it should have been . . . it was . . . close enough for people to survive until we had perfection." Cavendish dismissed the objection.

"But adults adapted to it by gradual replacement. And children were born into it."

Abruptly the prisoner's glance dulled, became the vacant, intro-

spective look that Gil knew so well. "Even the technical journals called it food poisoning."

"Yes, the First Family," agreed Gorski. "Picked by lottery to return. Given the full treatment, including a banquet of the best and richest foods on Earth as compensation for what they had endured."

Cavendish reached the logical conclusion. "Literally, they did die from food poisoning. And their deaths must have been unpleasant."

Gorski's bass-viol voice was muted. "I attended them. The youngest died in seven hours, the father lived three days."

Gil had been watching Frank's hands and he was ready with what their movements showed the prisoner needed.

Cavendish carefully lit the slim cigar and then said, "I was wrong. But tell me, do they still—"

"Oh, yes, they still go to Mars, though not in such numbers. Nor, with . . . well, we called those who went during the first years, the joyous ones.

"But they still go, and for the same reasons. Land virtually for the asking, the right to have children freely, these things would make Mankind colonize Hell without waiting to die.

"But they don't return. Or if they do, they die in a hurry and very badly."

Gil knew the light tone Gorski had used had been a deliberate taunting. But Frank asked his questions

in the way he leaned toward them.

The answers came from Gorski, definitely the superior in political matters.

"Directly, Dr. Cavendish, it was the Atomic Energy Law. Indirectly, it is the fact that sending food to Mars in the form of concentrates is now a gigantic business and our Bureau is still under the World Government's Department of Agriculture."

"The Global Grange—do you still call them that—prevents publication because you used radioactive tracer isotopes?" asked Cavendish. "Yes, I see how under the law they could. You appealed, of course."

"The Council on Grievances, which hears all complaints against the World Government, will get to our case . . . in about five years," explained Gil.

Cavendish leaned back, his face again expressionless.

Once more Gil yielded to Gorski.

"They go to Mars for freedom," said the man who had given his youth to that ideal, "and find themselves in a jail. For all practical purposes, our slaves. Yes, I said slaves, because what they earn is barely enough to buy what they need to live.

"They will not be content to remain so."

The surprise on the prisoner's face was also a question.

"You know these whom we are sending out. Or rather, you know the tests which weed them out so that only our finest can go. Follow

the implications of that to the logical conclusion history has taught: How long do pioneers remain slaves?"

Gorski lit another cigarette, inhaled slowly, continued: "However, that is not the major, the ultimate problem. In the long run, while we keep them and the others to come tied by an umbilicus cord to Earth, Man can never hope to reach the stars."

Silence for an eternity of two heartbeats, and Frank accepted: "What can I do?"

Blanding picked up a paper, laid it with a pen in front of Cavendish. "Taste-testing concentrates bound for Mars is at present the major part of our work. We want you as one of twenty volunteers for the next series of tests."

"And then?"

"Well," Gil began—

"One moment, please!" Gorski's voice was crisp, his manner that of a man speaking from deep experience. "If by any chance something would go wrong, the less you know, the less you can tell. You know they have ways to persuade anyone to tell everything."

"I've heard of those ways," Frank agreed. Then in a quick burst of the rage that Gil recalled so vividly, "Why can't you plow the lid off the whole stinking mess with a little publicity?"

Gorski leaned forward, put his elbows on the table, looked directly into the prisoner's eyes. "Dr. Cavendish, you always were a political fool. Few men, however, have ever shown that fact as clearly as you have by your presence here. So I am going to speak to you as the child you are.

"Neither we, nor those that we



are fighting, dare to bring this matter out into the open. Neither of us can be sure who would win.

"You would say along with my idealistic colleague here that the great moral sense of humanity would spring instantly to our support. You may be right. But we cannot risk that until the message is delivered. Then, the moral sense will find itself supporting an accepted fact. It is much easier to hail a conquest than to fight the battle leading to it."

Gorski drew back from the table and his voice deepened. "And we cannot be sure that they will support us even then. To understand me, look at the world about you.

"We are still not recovered from the shattering effects of the Great War. To almost every man the first necessity is the grim one of earning a livelihood.

"And we in one blow propose to destroy the economic foundations of millions of people. Farmers, manufacturers, transport workers of the trade routes on Earth and off of it, whose livelihood comes from feeding Mars.

"Add to them those who sincerely believe, or could be led to believe, that the safety of our planet will lie in keeping the colonies dependent, not free. Think how quickly suppressing us could become a sacred war.

"Now ask yourself, in justice to our cause, dare we take the risk of open battle?"

Cavendish reached for the pen.

Gorski sighed deeply. "But in all fairness to you I must tell you that this will mean your apparent and perhaps your actual death."

The pen did not waver.

But before he pushed the button to summon the guards, Gil had to ask the question that had haunted him for years: "Frank, why did you do it?"

The prisoner turned and spoke with all pretense in his manner gone. Sadly, nakedly, he called for understanding. "You, Gil, you too ask that? You who knew how much she was in my life, how much I blindly trusted her because I blindly needed her?"

"I gave her everything that she asked and found it was less than nothing to her. She was by instinct not made for open love. She preferred the sneaky, stolen pleasure.

"I have but one regret. That the police arrived before I drained the tank."

Cavendish turned to the door now opening slowly behind him, opening on gray blank walls and silence. But, Gil thought, not half as gray, not half as silent, as some parts of that man's life and mind.

Guards from the prison herded the convicts to the plane. But once inside the plane, only the presence of two officers seated facing the group and the consciousness of two more at the rear, reminded Frank that he was still a prisoner. The convicts were allowed to seat and group themselves as they pleased.

ASTOUNDING SCIENCE FICTION

Cavendish found himself with Clancy, his meat-cutter, beside him and Jesper, his head cook, ahead of him.

"Keesters, Doc, we got practically no guard at all," Clancy observed. "Four of them and twenty of-us. We could take over this plane."

Frank closed his eyes briefly, then opened them and shook his head. "Not a chance, Clancy. First of all, you know if we started trouble, our brother cons would jump us faster than those Security Cops. This volunteer business means too much to them. Second, you can't get into the pilot's compartment from this side of the plane. Third, there's this—" He pointed to the tiny, almost invisible vent in the window frame.

"Don't tell me, I know," Clancy moaned. "They can douse us but good with hypno-gas. I wish I could catch the guy who invented that stuff. The face-full that bank clerk gave me is what caught me. Say, how did you know that vent was there, Doc? Ah, why ask. You probably read it or heard it somewhere and I know by now how that memory of yours is."

The little crook bent over Frank for a glance out of the window. The plane had taken off and the barren pattern of Jackson Prison was clearly visible.

Clancy leaned back into his chair, a thoughtful look on his face. "You know, Doc, they say no one ever got out of there, but I bet you and I could have done it. I could have made sure that any guard who

could have seen us wasn't watching," and he made that inimitable, graceful gesture of hand and wrist which only a true knife-thrower acquires, "and even those electron-locks couldn't have held you. Don't kid me, Doc, I know. I've seen you work. One look, or one touch, and you've got whatever you saw or heard or touched in your head like it was part of you. I'm right, ain't I?"

It was not the first time Frank had faced that question, but many sleepless nights had given him his answer. "Yes, Clancy, I think we could have. But I never wanted to."

Frank caught the sidewise glance his little friend gave him, but Clancy went on with his biggest interest.

"How about where we're goin,' Doc? What's the chances to skip out of there? You've worked on this stuff, how tightly will we be watched?"

"I think we're going to Wisconsin, Clancy, where the big hobby is hunting. And you know as well as I what happens if a prisoner takes off from a government project. They just run it on the telecasts, 'Five Thousand Alive, Ten Thousand Dead, No Questions Asked!' Even if you got through the woods to New Chicago, how long would you last in the big town with that over you?"

And I hope Gorski has thought of that, Frank added for himself.

"Yeah, I forgot about that for a minute," and Clancy subsided.

But Jesper, the chef who had expressed his opinion about the government by trying to poison an entire political convention, was ready with more questions.

"Doctor, I volunteered for this because it offers a chance for a pardon and a pension. What exactly did I let myself in for?"

Only Jesper's long, lean face was visible over the back of his chair. But Frank knew that his chief cook's body was an extension of the face. A tall, lank frame barely covered with skin, with nowhere an ounce of fat. The man looked like anything except what he had been, the top chef for a string of hotels.

And Frank couldn't restrain a laugh.

"Jes, you're here for one reason, to eat everything put in front of you and tell what you think of it. And to make sure you do eat, you also are going to exercise. Every muscle in your body is going to get a workout."

Jesper's eyes widened with horror, but Clancy had the pertinent question. "Doc, how can eating be dangerous?"

Frank stopped laughing. "We'll be trying new things, Clancy, looking for the perfect combination. Storable, transportable, containing everything that is needed to keep a man alive. But they don't know what those things are and so they put everything into the concentrates. Now, maybe one of the things they

put in won't hurt you, but in combination with something else in the mixture—well, you make out a will before we start."

"I get it, Doc. I like strawberries and I like cream. But boy, what the two of them together do to me. Keesters, just once and never again—"

Although this was the sixteenth day that Frank had ground out the required ten miles on the stationary bikes, his legs felt as they had on the first day. They seemed as limp as wet macaroni as he weaved, not walked, across the gym floor.

Never thought that I would consider a gym mat equal to a feather bed, he reflected.

A thud on the mat beside him. Clancy, wet and dripping with sweat.

"Doc," the little pirate moaned, "you sure weren't kidding when you told us that we would exercise. You'd think they were training us for a fight and an honest one at that."

Cavendish sat up, wiped his face with his towel. "It's that last mile which gets me, when they change the gears."

"Me, too. I can take the other nine, it's that tenth one which never ends. And look at Jes. All these years he's been cooking and never gained a bit of weight. The fanciest stuff in the world, he sampled all of it and still looked like a walking skeleton. Then on this sawdust

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they're feeding us, he picks up four pounds in two weeks."

Frank glanced over at the tall man grimly pedaling away. "It's the combination of food and something he never did before, Jimmy. Regular exercise."

He lay back on the mat again, covered his face with his forearm. The glance at Jesper had also given him a look at the clock and confirmed what he had begun to feel. Any minute now those twinges would be a solid pain.

"Say, Doc, I know you think I'm full of questions," Clancy began—

And there it was, an agony that doubled him.

"Doc!"

Cavendish caught the note of fear in Clancy's voice, found a moment to think, *the little guy liked me*. Then the tearing hand was at his stomach again. A roaring in his ears, blackness shot with lightning before his eyes—had Gorski miscalculated, made this too realistic?

At a great distance he could hear Clancy shouting for help with a garnish of obscenities. A sound of running feet. Then, nothing.

He was weak, which probably helped to make the morgue seem colder than any other he remembered. But the coffee Blanding had brought was helping to both strengthen and warm him.

A key scratched in the lock and Gorski lumbered in. After checking the lock, he waddled over to the

dissecting table and leaned against it, puffing heavily.

"Well?" Blanding was sharply impatient.

"One moment, please. It was not difficult, but they infected me with their frantic excitement." Gorski lit a cigarette, drained half a cup of coffee in a gulp. "I finally got to Pritchard. He's the only under-secretary with any brains or backbone."

"And he agreed?" Gil asked.

Frank found himself tensing, even though there had been nothing he could do in this part of the plan.

"He agreed with all we want. Keep it as secret as possible, of course. He emphasized that more than I did. Naturally. The Grange has no desire to let anyone know that its wares might kill you. He will also help with this end. The agricultural agent for this area is a power in local politics. Our certificate of death will be accepted without any question. And there, he hinted, that the cause of death had better be officially unrelated to our work.

"I think, Dr. Cavendish, I shall have to discover an unsuspected weakness in your heart, a condition aggravated by exercise, not your diet.

"Also he will cover us on our hasty autopsy. It will be done on orders from above."

"Good." Gil's very posture showed his relief.

"I have more, even better because he will think it was his idea. Dr. Cavendish, we will perform the

autopsy on you tonight, to determine the exact cause of death. But immediately after we have determined the cause, we are to cremate you. Our findings are to be sent directly to Pritchard, marked TOPSEC.

"Your ashes are to receive a quiet burial tomorrow."

The old Pole shifted his cigarette to his left hand, waved the smoke away from his face with his right. His manner was abruptly sober.

"Dr. Cavendish, you are now officially dead. Not only to the world outside of this room, but in a few minutes, and only for the most vital contacts, you are also dead to us.

"My part, aside from dirtying the laboratory and sealing some ashes in a bottle, is done. This is my good-by and though I do not believe that you know what I mean, I wish you God speed."

The hand-clasp, though not especially friendly, was firm and strong.

Cavendish slipped from the table, tottered for a moment as his full weight came down on his legs and found them still wobbly.

"Dr. Gorski," he said, "I will always remember you as a man who missed his real vocation of directing realistic dramas. You had even me convinced that I was dying."

The Pole's rumbling chuckle followed them to the door. There, while Gil reconnoitered the route ahead, Frank turned for one last look at Gorski.

Under the Atomic Energy Law, both Karl and Gil faced prison, and more, if anything went wrong.

But the old man was seated in a chair large enough to bear his weight, clearly set to enjoy himself with the last of the coffee before starting to work. He seemed completely relaxed, blowing out smoke rings aimed at encircling a cup on the table before him.

Wish I felt that confident, Frank thought.

Kushalik—

Maybe a man, maybe just a name, maybe an organization, any one, any two, or all of these. We do not know with certainty. Only of this can we be sure: his is the striking arm for that coalition of transport companies, farmer unions, and bureaucrats which we call the Global Grange. He kills for them—

Frank Fitzgerald looked at the figures in his sales book. They represented a week's work for the Mellon Drug Company and if the other salesmen were doing comparably, the company would have to declare an extra dividend.

He leaned back to light a cigarette while he estimated his commission. Let's see, that total put him in the two per cent overwrite bracket—

With a grunt he bent forward and stubbed out his cigarette. He put his guess-timate—a guess because he was still uncertain about the arbitrary deductions—in his personal record and leaned back again.

Suddenly, he looked at his ash-tray and laughed.

This time there had been no need

to fight against the impulse to pinch off the glowing tip and stow the butt away for future use. Freedom and its luxuries were no longer new. The habits of prison, where tobacco had been the stable medium of exchange, had been replaced by the careless gestures of an unrationed man.

Frank Cavendish had come a long way in two months.

And, looking at his hand-luggage in the corner of his hotel room, Frank reminded himself that he had a longer way to go.

He lifted the bottle on his desk up to the light. Dammit, the chambermaid had been after it again. But there was enough left for three good drinks. Carefully spaced, they would carry him through the last of his preparations for the trip to Mars.

Let's see, what was left to do?

He rose from his chair and walked over to the bed where his few personal possessions were spread. You couldn't take much with you, even today, when the IO drive had made interplanetary transportation a business, not an adventure.

The sample case went with him. He would feel lost without it.

"You must live this role, not act it. Otherwise, you have no chance to get by Kusbalik."

He opened the case and looked at the rows of tiny bottles. Each gleaming cylinder was filled to its top with one type of pill, tablet or capsule. The collection rivaled the spectrum in colors and a cross-section

of humanity in sizes. The important part of the display, however, was not the tubes, but the cryptic symbols beneath each one.

Those symbols were married to his notebook, which would have to remain behind for his successor.

He leafed the pages of the notebook, remembering how it had almost made a schizophrenic of him.

The first page was a time-schedule, listing the days on which he should visit each part of the city. The rest of the notebook was divided according to that schedule and named alphabetically the doctors on his routes. Each doctor had a page and a careful analysis. Estimated number of patients and income according to that basis, a method borrowed from the Internal Revenue Bureau. Previous sales. When to suggest re-orders. Habits and prejudices. Best time to go to each office—

Yes, he reflected, putting the book down, this almost made a schizo of me. Until I learned that the coded prices under each tube were just as important as the contents. He flipped open a page and glanced at the income of a General Practitioner. A rare bird in these days of specialists working together in clinics, a GP earned every penny of his income.

And what an income!

He turned back to his desk and poured a second drink, chuckling to himself as he did so. That last thought, consideration of a doctor's income, showed how much the personality of Dr. Frank Cavendish, re-



search specialist, had been submerged in the character of Frank Fitzgerald, drug salesman.

"Keep your first name, it's a common one. And you won't be surprised when people use it."

Then again his thoughts jumped back to the money that GP made each year and suddenly his wife's face was in front of him. Not as she had been alive, but with the facial muscles loosely flaccid, as she had looked when he had severed that classic head from that beautiful body.

Had he been wrong, dedicating himself to research? Would there have been any difference if he had made a lot of money for them, given his wife the income that the wife of that GP had?

The visiphone buzzed gently and he lit his screen. "Mr. Fitzgerald, Mellon Drug representative, speaking."

And I am Frank Fitzgerald again, a part of him discovered.

"Cut your screen, Frank, someone may look over my shoulder. There was a traitor in the Bureau. He didn't have a chance to report much, Gorski saw to that. But he did get the word out that another messenger is on the way.

"If there's any more we dare to do for you, we'll try. But I don't know what it could be. Nothing, probably.

"So it's all up to you. Good luck and good-by."

The click and buzz of an ended call.

Frank snapped off the 'phone and stared at the bottle. Well, Gil, I don't know what I can do, either. Keep my eyes wider open, sure. Thank you for the warning, of course. But anything else—

Wish I had lived in other times, he thought. Then a man with a message carried a silver greyhound on his watch chain. Merely by showing that symbol, the messenger got the best in transportation and services, including police protection.

He disdained the glass, finished the bottle by picking it up and draining the last shot.

There was so much he didn't know, would probably never know—where was the real Frank Fitzgerald, whose place he had taken? What had happened when he had been supposed to report to the home office for psychiatric clearance before the flight to Mars?

He himself had simply gone to Philly for two days and returned to find papers in his room stating that he was a certified Planet Pioneer.

Most important, who and where was Kushalik?

The flavor of the whiskey was still in his throat as he got into bed, appreciating for the last time the convenience of a hotel apartment.

And two names drifted together as he slipped into sleep. Kushalik and the real Frank Fitzgerald.

One part of our race laboring to tie us down and the other working just as hard to cut the ropes.

Frank took a long, deep breath

before he entered the room. So far, he had passed each of the final examinations which InterPlanetary Transport insisted on before they risked the delicate movement of a human body to the spaceship already building up overhead.

All his baggage had been taken from him, and, he was sure, scrutinized with care. His physical person had been examined minutely. No one carrying any type of container anywhere in his body could have gotten past those precise searches, personal and assisted by every mechanical aid.

The psychiatric was the last.

He opened the door and gave the room a quick, skimming glance as he walked to the chair facing the psychiatrist.

And he found that the days he had spent being a drug salesman, meeting all types of doctors, were all of a sudden a source of strength. I had been ready to tell Gorski that whoever picked that job for me had been joking, he remembered.

"Frank Fitzgerald?" The doctor checked the form, glancing up occasionally as he sped through the routine. Abruptly he stopped speaking, but kept on reading.

He's come to it, Frank decided.

"I see that you are a drug salesman, Mr. Fitzgerald."

"Yes, sir. A very interesting occupation. Doctors are nice people to meet and know, even in a business way."

"Mellon Company—" thoughtfully.

"Yes, sir, the biggest and the best." A reminder of how much IPT profited by carrying Mellon Company cargoes both ways.

"I see that you've already had psychiatric preparation for the trip."

This was the gamble. "No, sir, I haven't."

"What's that?"

"Just what I said, sir. All I did was go into a room and sit down to talk to the Company doctor the way I'm talking to you. It seemed to me that we only talked about five minutes, but I checked my watch later and it must have been longer. Anyhow, we just talked, then he stood up and said I was ready to go."

Frank shook his head as though puzzled. "From what I'd heard, I thought there was going to be more. But I didn't get any more, so I finally figured that they thought I didn't need it."

All through his speech Frank had carefully watched the doctor for signs that his character as a man who had been gassed and conditioned without knowing it was being accepted.

They came. That tightness which had jumped around the doctor's mouth when Frank had first said no preparation had been made, the little crease between the eyebrows—both disappeared. A short nod, probably approval of a job well done—

The next question came smoothly. "You seem to me to be very well adjusted, Mr. Fitzgerald. However,

I cannot possibly know you as well as your Company physician and I would like to test the totality of the adjustment. Would you consent to a whiff of hypno-gas? It takes—"

"No, sir."

Frank made the statement firmly, like a man sure of his rights.

"You know, of course, that I can insist, to the extent of refusing you passage."

"The answer is still no. The Company warned me about this, told me if you . . . listen, all salesmen know things which the Company doesn't want made general knowledge—"

"I won't insist," the psychiatrist cut in, "you are obviously ready to go. Congratulations, Mr. Fitzgerald. You have the spirit that this age needs more of. Just wait in your room for further instructions."

Back in that cubicle, and only then, Frank allowed himself to relax completely.

The cheapest way to go to Mars was in "deep sleep." But Frank preferred to travel awake and Mellon Drugs, delighted to have a volunteer for the work on Mars, paid the enormous difference without objection.

The first "day" was rough, even with Frank's background of experience on the artificial satellites while doing research on the proper foods in a weightless environment. But the tumble-bug gyros at last established Up and Down and Frank began to meet the other

Planet Pioneers also making the trip awake.

There were a number of very attractive, single women making the journey. They were bright lights against the drab walls and almost every man on board became a moth.

Frank remained aloof until one of the women said to him, "You're a funny sort of traveling salesman, never looking more than once at any girl."

The remark alerted him. He understood why these lovelies were making the trip. And making themselves available.

"I'll have to be careful with you," the girl giggled. "You're a drug salesman and you may put something in my drink that wouldn't be good for me."

"Wouldn't be good for you?" Frank asked.

"You know, might make me do things that a nice girl doesn't do on her first date with a man."

"Honey, you're safe with me," he assured her and proceeded to make himself a liar.

You must live this part, not act it.

Both pleasure and self-protection kept him with Clarissa for the ten days that the IO drive needed to get them to Mars.

It was easy to laugh with her.

Both of them especially enjoyed the busybody professor who spent endless hours running in and out of a special compartment. In a day, everyone knew the rabbitty little man's business. He was shepherding a supply of whole blood in vacu-

seal to protect some high IPT officials from anemia.

A fact for Gorski, Frank reflected, confirming what he thinks. This coalition is not as solid as it looks. Show IPT how they can make or save money by having the planets independent—

Then Mars Satellite Number One was outside the ship and routine became inescapable. Frank could break the chain only long enough to say a passionate good-by to Clarissa and make plans to meet her on Mars.

But he knew he would never see her again.

Kushalik would surely have other plans for her and those with her.

Frank waited for two days before he went to the Science Clinic. During those two days he went through the process of setting himself up as Mellon Drugs' new representative: A room at the hotel; baggage checked and stored; identifying himself to the sad-faced, weak-lunged secretary; establishing credit at the bank; freight to the Mellon warehouse; putting the office in order.

Then he took a sample of Mellon's new version of a multi-vitamin and went to the Clinic.

"Dr. Richards, please," he told the young man at the reception desk.

"Whom shall I say is calling and for what purpose, sir?"

"Frank Fitzgerald, for Mellon Drugs, about arranging an oxidation test for some new compounds. He'll understand. The speed here will be different."

The young man fiddled with the jack for a moment before he made the call. "Mellon Drugs," the boy said. "You must be the new one."

"I am. Just landed a couple of days ago. Why?"

"You'll either have to confirm the old contract or sign a new one. Will you remind Dr. Richards, sir? And he's down that hall to the very end, go left, then watch on your right for L-14. Go right through the office. He's in the lab beyond it."

Long, eager strides and a few moments later, Frank introduced himself to a harassed man in a white smock. The doctor was so obviously trying to conceal his irritation at being interrupted that Frank decided to play his role to the very last minute.

"I regret disturbing you," he apologized, "but I believe my business is sufficiently important to warrant it. If you have the materials available, I would like to dictate a new contract between the Mellon Company, your clinic and yourself. On perma-tape, please."

For a moment Richards was impressed, as Frank meant him to be. The request for perma-tape indicated a long-term contract and probably more money for the doctor and the clinic.

Then again Richards looked harassed. He hesitated, said, "I wonder if you would mind dictating here. I had this set up," and he indicated the recorder on the lab table, "so that I could make a running account of this dissection. I

could save a lot of time by just switching the tapes back and forth."

"Glad to," Frank agreed. He seated himself where the doctor had been, studied the specimen until Richards returned.

"Looks like a sort of 'possum," Frank commented.

"What? Oh, yes, it does. In fact, we call it a Marsupial." Richards blew across the mike, his eyes on a dial. "Go ahead, it's ready."

Frank closed his eyes for a moment, opened them. In an even, unemphasized tone he started dictating what he had memorized while he had been Dr. Blanding's guinea pig. When he started, he saw three scalpels lying on the table in front of him. An edge of his mind remembered what Clancy had taught him, and as he spoke, he played with the razor-edged knives.

And that part of his brain which made him the perfect messenger, a true eidetic memory, continued to produce smoothly the message which was in effect a declaration of independence for Mars and for every other place where the human race would try to find a future.

The Message. Twenty-four closely-typed and printed pages of analysis, beginning with the original formulation and broken down to the variations that naturally exist among men. The differences between a pygmy in the rain-leached jungles of Malaya, an Eskimo's winter diet and a suburbanite roving the restaurants of New York.

The Message. Mankind was now
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free to reach for all the planets, even the stars. They would no longer be bound to living on Earth-grown concentrates. No other water would ever be like Earth water. But now they knew exactly what to add, down to the most minute trace element, to make a hydroponic diet both beneficial and easily available anywhere.

The Message. Finally past the men of IPT. Men able to censor mail because it had to be microfilmed; allowed to examine baggage; permitted to screen would-be passengers with hypno-gas and psychiatric examination—all this in the name of the twin gods called Weight Limits and Safety Precautions.

Gods who had been only masks for an ancient one called Greed.

To Frank, Dr. Richards was only a figure on the edge of his consciousness. But he became vaguely aware that the doctor was becoming more and more restless.

Abruptly Richards' hand jumped forward and snapped off the recorder. "Impossible!"

Frank felt as he always did when something interfered with his memory's function of reporting without error. A great light within himself snapped off and the lesser light around him gradually came back into focus.

"What did you say?"

"These so-called formulae you are dictating. You're too late, you imposter! We got this yesterday as liquids."

"Then I was not the only mes-

senger," Frank said, strangely disappointed.

"The only one? You're not even the real one. There's only ever been one man that I know of who could do what you're pretending to do, and he died months ago!"

"In . . . one . . . of . . . Dr. Blanding's . . . diet . . . tests—"

The last words had come more and more slowly. Dr. Richards resented himself, gaze fixed on Frank's face.

"I never met the man," Richards said in a whisper, "but of course I've heard of him. What he wrote is required reading. And I saw his picture just last week, in an old Journal I was checking.

"Go ahead, Mr. . . . Fitzgerald."

"Please sit still."

Closing the door from the office as quietly as he had opened it, stood a man distinguishable for thousands seen on any street only because he had a gun in his hand.

"Congratulations, my dear sir." The man spoke with sober precision. "You deceived my entire organization. You almost deceived me, except that I could not believe Blanding and Gorski would try anything so desperately obvious as that blood bank. However, those fools who work for me would have had it so. There is only one messenger, they insisted.

"One messenger! Fools!"

"You must be Kushalik himself," Frank said.

"But he delivered the blood bank!" Richards could not hide his

feelings, spoke like a man in shock.

"He's not the man who brought it from Earth. And I hate to think what would have happened if you would have used it as a guide," Frank stated grimly.

"When they do use it," Kushalik corrected the statement, "because—"

He did not finish the statement directly, did not have to. Instead, "And I think I shall have to end Gorski and Blanding also. This last has been too much."

He regarded them as a man will look at a chess problem. "Too bad you shut off that recorder, Dr. Richards. I could have used part of that tape to make this more realistically a double murder. But—"

Frank weighed the chances and considered both results. In a deep breath, he reached his decision and he spoke to distract the gunman.

"Kushalik, do you know why prison foods are prepared so that they can be cut with a fork?"

The nondescript man paid no attention. "Dr. Richards, will you please move to this side of the table." He indicated a place opposite to Frank with a gesture of his gun hand.

The first scalpel Frank threw went into that gun hand just above the wrist. Kushalik's head went back at the shock of the sudden pain and when the second knife struck, it hit below the aiming point. It buried itself to the hilt where the chin became the neck. The third missed the left eyeball completely and made

only a long gash along the scalp.

But the third one hadn't been needed, Frank noted. The second had done the job.

"Thank you, Clancy," Frank said aloud.

"What did you say?" Richards' voice was hoarse.

"Nothing important, just a comment on how ignorance can kill a man."

He walked around the table and looked down on the enemy. Kushalik's eyes were flickering.

"Not dead, just paralyzed," Frank said. "Must have gone through and caught the spine, which is why he didn't shoot."

He reached down, pulled the knife out of Kushalik's throat and drove it into the gunman's heart. "You've got good scalpels, doctor."

Absently, his mind busy with the larger problem, he picked up a handful of paper towels from the table and laid them over Kushalik's throat.

"Don't want too much blood around here," he went on, thinking and planning aloud. "Let's see, we could claim self-defense, get away with it, too. That gun in his hand . . . yes. But then his organization would know that there *had* been another messenger. And that wouldn't be good. I don't think they'll break up just because this one is dead.

"Now, how did he know that I was here? Got it, sure, that boy at the reception desk. But I'll bet the kid doesn't know anything except to call a particular number when a

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certain type of stranger shows up. I think we can count him out."

"Richards!" He spoke sharply and the doctor began to come out of his daze. "Kushalik will have to disappear. They'll hunt for him, but because of the way he seems to work, they won't start hunting for a couple of days. With luck, they'll never be sure of what happened to him."

"In any event, we'll have the time we need, time to get out enough copies of the formulae so that it can never be suppressed. Yes, and we'll get the fact that it exists in the news-casts, too."

Coldly, Frank measured Dr. Richards and he liked what he saw. The man had made a fast recovery.

Cavendish glanced around the lab. "We'll use that large sink. By the way, it does drain directly into the main sewer, doesn't it? Good."

"Now, we'll need some stuff from the chem lab. And outside of that, there won't be much for you to do. I'll take care of the rest."

"You may remember," he said easily, taking a long look into his past, "that I have had experience with this business."

THE END

THE ANALYTICAL LABORATORY

The theme which H. Beam Piper presented in "Omnilingual" is one which most science-fictioners have, I think, sought to put over to friends time and time again. Piper did a lovely job of presenting it, judging from the response!

FEBRUARY ISSUE

PLACE	STORY	AUTHOR	POINTS
1.	Omnilingual	H. Beam Piper	1.41
2.	Get Out of My Sky (Conc.)	James Blish	2.62
3.	The War Is Over	Algis Budrys	3.33
4.	The Man With the Corkscrew Mind	Stanley Mullen	3.39
5.	Unlucky Chance	M. C. Pease	4.17

Which means that you readers have voted Piper the 1¢ a word first-place bonus, and Blish the 1½¢ per word bonus. Your votes are of very real interest to me, and to the authors—inasmuch as they have a real, economic meaning. Maybe we should have some sort of slogan about it? "A postal card of praise means a penny a word," perhaps?

THE EDITOR.

THE TRAPPING OF THE SUN

Life, once started on a planet, is a chain reaction—and any chain reaction, once started, will consume any quantity, however great, of the material it works on. Even whole oceans of nutrient chemicals last but moments of geological time. Until an income could be achieved, exhaustion and death was the only possible outcome. . . .

BY ISAAC ASIMOV

The first and greatest discovery by man was the use of fire. That discovery, more than anything else, was the point at which he was raised from beast to man.

The Greeks recognized the importance of the discovery and viewed it as a gift of the demigod, Prometheus, who stole fire from the sun and brought it to naked and shivering man. To the Greeks, fire was a piece of the sun, trapped and made tame, bent to the use of man.

If for "sun," you say "energy," the Greeks were right.

When man learned to start a fire by rubbing two sticks together, he put at his own disposal, for the first time, a source of energy other than that contained in his own body. It was because man, with fire, had more energy at his disposal than

had any other animal in creation that he became something more than animal.

But man's discovery some thousands of years ago was only an echo of a similar and even greater discovery made by a primitive bit of life perhaps a billion years ago.

In the previous article of this series, we left life a nucleoprotein molecule adrift in the primordial ocean. It was alive, but it had no source of energy but what happened to come its way. (It was like a man who had to wait for lightning to hit a tree before he could count on a bit of fire.)

This article now considers the way in which a microscopic organism anticipated Prometheus by a billion years and, to raise itself to higher estate, stole the fire of the sun.

Let's begin the story with ourselves here and now. Our body makes use of energy constantly. Our muscles contract. Our nerves carry electrical impulses. Our kidneys filter our blood stream. Our cells manufacture complicated molecules out of simple ones. All these things take energy. Where does it come from?

We can be specific and take a chemical reaction such as the union of two amino acids to form what is called a dipeptide. The dipeptide can join up with a third amino acid to form a tripeptide; that with still another to form a tetrapeptide; then a pentapeptide; a hexapeptide; a heptapeptide; and so on indefinitely—or at least as far as your knowledge of Greek numeral prefixes will allow you to.

When enough amino acids have combined with one another, a protein molecule is formed, so this type of reaction is the very basis of life. Without it, a nucleoprotein molecule could not duplicate itself out of the raw materials about it and without *that*, there is no life.

Yet there is a catch. Two amino acids, if brought together, will not combine of their own accord. A dipeptide contains more energy than two amino acids separately. Every time another amino acid is pushed into line and bound to the peptide chain, the energy of the peptide is increased. That energy must come from somewhere.

The amount of energy that has to be put into the hookup of each amino acid varies from 0.5 kilo-

calories per mole to 4.0 kilocalories per mole, depending on the particular amino acid involved. (If you happen to know what a "kilocalorie per mole" is, I am happy for you. If not, it doesn't matter. Just keep your eye on the numerals.)

The body gets the energy it needs for this and almost all other similar jobs from "high-energy phosphate bonds" present in its tissues—and in all living tissue.

There are certain compounds, you see, the molecules of which contain a phosphate group—made up of a phosphorus atom, two hydrogen atoms and four oxygen atoms, $-OPO_3H_2$ —that hangs on rather precariously to the rest of the molecule. The chemical bond between the phosphate group and the rest of the molecule is taut, in a manner of speaking, ready to give with a bang. When the phosphate group does break off, nearly five kilocalories per mole of energy are turned loose. That is more than enough energy to tie any two amino acids together.

The high-energy compound most used by the body for such jobs is called adenosine triphosphate. This compound carries no less than three phosphate groups in a line and we can write it A-P-P-P for short. Sometimes one phosphate group is knocked off, sometimes two.

When the A-P-P-P breaks up, part of it sticks to an amino acid in the neighborhood and forms a high-energy amino acid complex. The complex now contains enough energy to be able to latch on to

another amino acid without trouble and while it is doing that, it lets go of the piece of the phosphate it was holding. That leaves a dipeptide. Repeat the process over and over and a protein can be built up.

If all this wordage has you frowning just about now, try Figure 1, which says the same thing more schematically.

The only trouble with all this is that someone in the audience is bound to ask: And where does the body get its high-energy phosphates from? After all, for every amino acid stuck on to a peptide chain, one high-energy phosphate goes down the drain, and the body's supply of such phosphates is exceedingly limited.

Obviously, the body has to make high-energy phosphates as fast as they are used up—but how? To stick a phosphate group back on to the molecule from which it was broken requires just as much energy as was released by the original break; that means nearly five kilocalories per mole. (In matters of energetics, remember this above all: you can't get something for nothing. That's called the First Law of Thermodynamics and, in science-fiction stories, it is probably ignored and violated more often than any other established scientific law on the books.)

Well, if the body has trouble putting amino acids together at four or less kilocalories per mole a throw, how will it manage when faced

with finding five kilocalories per mole?

It seems there is another type of chemical, which biochemists have only grown to appreciate quite recently, called an acyl mercaptan, in which the key group of atoms is made up of a carbon, an oxygen, and a sulfur—(CO)-S. The acyl mercaptan is even more energetic than the high-energy phosphate. When the (CO)-S combination is broken, a little over eight kilocalories per mole are let loose.

That's enough to form a high-energy phosphate bond.

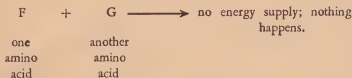
Only—and you're ahead of me, I know—where do the acyl-mercaptans come from? The body makes them, but how? Now it has to find eight kilocalories per mole to put an acyl mercaptan back together again. (It's like the question that used to plague me when I was young. You need tools of a particularly hard steel alloy to shape ordinary steel objects. Then you need tools of a harder steel to shape the hard-steel tools. Then you need tools of a still harder steel to shape— You get the idea.)

To see where the acyl-mercaptans come from, we have to consider the food we eat.

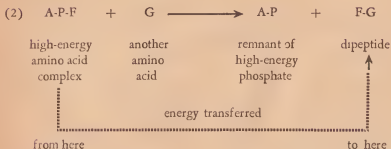
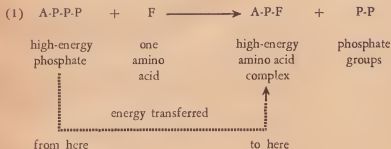
Our food consists of a number of kinds of compounds but, as far as energetics is concerned, the two important classes are the carbohydrates and the fats. Both carbohydrates and fats are made up of carbon atoms, hydrogen atoms, and

Figure 1. How a High-Energy Phosphate Works

a) In the absence of high-energy phosphates:



b) In the presence of high-energy phosphates:



oxygen atoms, but not in the same proportions.

Both carbohydrates and fats are slowly combined with oxygen (i.e. "oxidized") in the body, through dozens of steps, until nothing is left but carbon and hydrogen atoms combined with all the oxygens they can hold. The final products are carbon dioxide (CO_2) and water (H_2O).

We can summarize by writing the following:

carbohydrates (or fats) plus oxygen gives rise to carbon dioxide and water.

But carbohydrates and fats contain more energy than do the carbon dioxide and water molecules to which they give rise. The energy left over in the conversion is turned loose so that we should really write the following:

carbohydrates (or fats) plus oxygen gives rise to carbon dioxide and water *and energy*.

This last bit is obvious if carbohydrates or fats are strongly heated. Fats will begin burning. Carbohydrates will char first and then glow and burn slowly. Both will be converted to carbon dioxide and water and the energy released will be given off in the form of heat and light.

The same quantity of energy, not a hair-breadth more nor a hair-breadth less, is given off when the carbohydrates and fats are combined

with oxygen in the body. The chemical pathway of change in the slow oxidation in the body is radically different from that of the rapid burning in a flame, but the energy developed in either case is the same. (It's the First Law of Thermodynamics again.)

The big difference is that oxidation in the body, being slow, is under control. The energy given off is not in the form of a dancing flame pouring heat and light uselessly into space. Instead, the energy is given off in little spurts that are captured in neat packets in the form of high-energy compounds.

The crucial step in oxidation within the body is the combination of hydrogen and oxygen. The hydrogens that occur in a molecule of fat or carbohydrate—or which are stuck on in the course of the chemical changes they undergo—are combined with oxygen; two hydrogen atoms for each oxygen atom. Every time two hydrogens are removed from a molecule and combined—via a number of steps—with an oxygen, forty-five to sixty-five kilocalories per mole are released. This is much more energy than even an acyl-mercaptan bond represents; six to eight times as much.

However, the energy of such a hydrogen-oxygen combination within the body is put into the formation of only two to four high-energy phosphates.

The energy changes in the known steps from the food we eat to the protein built up in our tissues is

shown schematically in Figure 2.

Figure 2 should make one point clear that some people manage to scramble rather badly.

It is the long experience of mankind that everything tends to run down. Clocks stop, iron rusts, water runs downhill, living creatures age and die, the hills weather and erode into sand, the Earth's rotation is slowing, the sun is using up its hydrogen.

This is an important and universal rule that everything is gradually running down and scientists call it the Second Law of Thermodynamics.

Some people have been impressed by the fact that life seems to have a contrary effect. A human being can wind a stopped clock, resmelt rusted

iron, pump water uphill again, rejuvenate age by giving birth to young and so on. There is the feeling that there is something in life which is not subject to this running-down rule and therefore something which makes it superior to the laws of physics or chemistry.

Not so.

It is all very well to point out that man can take a lump of iron ore and a mess of bauxite and sand and clay and make steel beams and aluminum and glass and bricks out of them and put them altogether to make a beautiful skyscraper. This is "building up" rather than "running down"—*it seems*.

But in order to bring this about, man has had to use a mess of energy in the form of burning coal to smelt

Figure 2. Energy Statistics in the Body

2 hydrogen atoms from the fat and carbohydrate we eat combine with an oxygen atom from the air we breathe and	yield	45 to 65 kilocalories per mole
This is enough to form 2 to 4 acylmercaptans which, on splitting,	yield	16 to 32 kilocalories per mole
This is enough to form 2 to 4 high-energy phosphates which, on splitting,	yield	9½ to 19 kilocalories per mole
This is enough to form 2 to 4 amino acid hookups which, on splitting	yield	1 to 16 kilocalories per mole

the iron ore and fuse the sand and bake the clay and make the electricity that will separate the aluminum out of the bauxite. And human energy has had to be used, too. All this burning coal and sweating humanity represents a "running down" that is much greater than the "building up" involved in making the skyscraper.

Our whole civilization depends on the running down—as fast as possible—of the energy content of the coal and oil reserves of the world. And the running down of these reserves and the energy they represent is much greater than the building up we manage to do as a result. It can't be helped. The Second Law of Thermodynamics has never been broken yet.

See how Figure 2, now, shows the way in which the human body runs down. You start with forty-five to sixty kilocalories per mole when a pair of hydrogen atoms are united with oxygen. You end up with two to four amino acid links which represent an investment of one to sixteen kilocalories per mole. You're building up your protein—at a one to sixteen rate. You're running down your food—at a forty-five to sixty-five rate. Anywhere between sixty-five and ninety-eight per cent of the energy of your food is just wasted. It is given off as heat and if you work hard, you will yourself note that one of your body's chief concerns is to get rid of all the heat that is being produced at the same

time that some work is being turned out.

Since evaporating water will absorb heat, the body is designed to perspire. On humid days, when water will not evaporate very well, you feel completely miserable. It's not the heat, you say, it's the humidity. But it *is* the heat, just the same; the body heat you are developing and don't want and can't get rid of fast enough.

Not only we, but all living creatures get by on the energy developed by converting carbohydrates and fats to carbon dioxide and water. All organisms use a small bit of the energy and throw the rest away. But then where does the supply of carbohydrates and fats come from? In a billion years or so, we haven't run out.

We, and other creatures as well, make our own, of course, but that scarcely counts since the energy required to make it comes from energy developed by oxidizing carbohydrates and fats to begin with. And since you can't beat Second Law, the amount of carbohydrate and fat you must run down to get energy is greater than the amount you can build up with that energy.

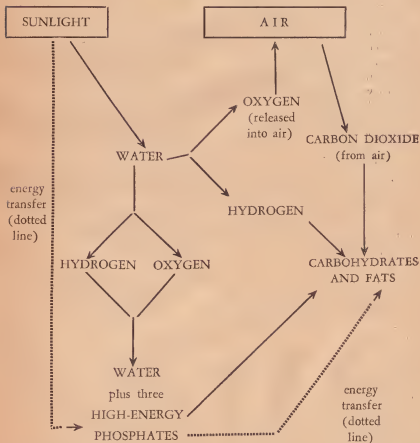
And it's no use saying you get your fat or carbohydrate from milk, or beef, or eggs, or poultry or pork because cattle, chickens, and pigs are busy burning carbohydrates and fats much faster than they are storing them in their own tissues or in eggs and milk.

No, if we are to have life continue for more than a short time, we must find a way of creating carbohydrates and fats by some method that doesn't use up carbohydrates and fats. A new source of energy must be found.

The green plant does the trick;

it has trapped the sun. It has found a way of taking the energy of sunlight and using it to break the water molecule into hydrogen and oxygen. (The energy required to break the water molecule is about sixty-five kilocalories per mole, but to manage the trick, the plant has to use prob-

Figure 3. Scheme of Photosynthesis



ably one hundred kilocalories per mole of light energy; possibly up to two hundred kilocalories per mole. Second Law wins out again, but fortunately the supply of sunlight is virtually endless.)

Some of the separated hydrogen and oxygen recombine to liberate enough energy to form three high-energy phosphates for every molecule of water re-formed. These high-energy phosphates are used to supply the energy that will enable the rest of the hydrogen to combine with the carbon dioxide of the air to form carbohydrates and fats. Figure 3 presents the process—called "photosynthesis"—in schematic form.

Notice that photosynthesis represents almost the exact reverse of the process that goes on in our body. In our body, it is:

carbohydrates (or fats) plus oxygen yields carbon dioxide plus water plus chemical energy.

In the green plant, during photosynthesis, it is:

carbon dioxide plus water plus solar energy yields carbohydrates (or fats) plus oxygen.

The oxygen produced and the carbon dioxide used up in photosynthesis changed the atmosphere from its primordial composition of ammonia and carbon dioxide to the present composition of nitrogen and oxygen as explained in my article "Planets Have an Air About Them."

To summarize then, green plants convert solar energy into chemical energy, and their cells then live upon the chemical energy stored in carbohydrates and fats.

All animal life lives upon this chemical energy, too, either by eating plants or by eating animals that have eaten plants, or by eating animals that have eaten animals that have eaten plants, and so on. No matter how many animals can be forced into the one-eats-another chain, at the bottom is some green plant and that supports all the rest. This includes sea-life, where the one-celled plants, called algae, swarm in the surface layers of the ocean and form the foundation upon which rests all other marine life from worms to whales.

How does all this apply to the lonely little nucleoprotein molecule adrift in the primordial ocean—with which I ended my previous article, "The Unblind Workings of Chance"?

The only chemical property we know it must have had is the ability to construct another molecule of itself out of simpler molecules such as amino acids. But tying amino acids together takes energy. Where did the nucleoprotein molecule get the necessary energy? From carbohydrates and fats?

Probably! The ocean, you may remember, was swarming with organic molecules formed by the action of lightning on the primordial atmos-

phere and the action of ultraviolet rays from the sun upon the simple compounds in the ocean. The end result must have included the simpler carbohydrates and fats.

But there was no oxygen in the primordial atmosphere. The first step in getting energy is to combine the carbohydrates and fats with oxygen. Well, then?

The most common solution to this problem involves a process known as glycolysis. In glycolysis, a molecule of glucose—a simple sugar—which contains six carbon atoms, twelve hydrogens and six oxygens is split—via a number of steps—into two molecules of lactic acid, each made up of three carbons, six hydrogens and three oxygens. Enough energy is released by this split to form two high-energy phosphates.

Glycolysis is inefficient in comparison with the complete oxidation of glucose to carbon dioxide and water. That complete oxidation would give rise to no less than thirty-two high-energy phosphates. But glycolysis has this advantage: *it doesn't require molecular oxygen*. Even today, when there is plenty of oxygen in the air, tissues sometimes make use of glycolysis when the demands for energy are greater than the rate at which oxygen can be supplied. Muscles, when engaged in active work, make use of glycolysis. Embryonic tissue, which is chronically short of oxygen, makes use of glycolysis to a certain extent.

Presumably, then, the primordial

nucleoprotein molecules made use of glycolysis to make their high-energy phosphates and got along without molecular oxygen.

But how does the nucleoprotein bring about all the necessary changes? How does it split glucose molecules and make high-energy phosphates and split those and combine amino acids and so on? It is so easy to say "the nucleoprotein does this and the nucleoprotein does that," but *how* does it do it?

Which brings us to the question of catalysis.

There are a great many reactions which take place readily when the conditions are right, which take place scarcely at all when the conditions are not right.

For instance, suppose it was vitally necessary for you to make a certain notation and you had both a pencil and a piece of paper in your possession. Suppose, however, you were standing in the middle of a vast and featureless plain, built of undulating sand. You would have nothing to rest the paper on and you could make your notation only with great difficulty and probably not very legibly.

Suppose, however, a flat board of some hard smooth material suddenly made its appearance. Using that to write on, you would have no problem. The job could be done quickly and well.

Now you used the board neither to write with nor to write upon directly. It simply offered you a sur-

face on which what you wanted to do could be done. Further, it was in no way used up. If you had a trillion notations to make on a trillion pieces of paper, the same board could be used for all, given enough time.

The writing board is an example of a catalyst.

There are molecules or conglomerates of molecules which do not take part in a chemical reaction but which offer surfaces upon which that chemical reaction can take place speedily. Protein molecules are particularly good for this purpose because their surfaces are so varied from spot to spot.

Every protein of respectable size contains at least nineteen different kinds of amino acids, dozens of each, perhaps. Each kind of amino acid is made up of different combinations of atoms and even when they are bound together to form proteins, portions of them, known as "side-chains," are present on the surface of the protein molecule.

These side-chains vary in several ways. Some are made up of carbon and hydrogen atoms only. Some of carbon, hydrogen, and oxygen; or carbon, hydrogen and nitrogen; or carbon, hydrogen and sulfur. Some have an electrical charge on them and some have not. Of those with an electrical charge, some have a negative charge and some a positive.

The result is that the surface of a protein, any protein, has a particular pattern of atoms and of electrical charges.

A molecule which could be involved in some type of reaction may happen to find on some portion of the protein surface a kind of atom and charge distribution which just fits its own. It snuggles in and forms a "complex." Such a complex—for reasons I can't go into now; another time, perhaps—reacts more easily than the molecule alone would.

For this reason, a molecule which would seem perfectly aloof ordinarily, would, upon hitting the appropriate portion of a protein molecule, instantly undergo changes. It might break apart or pick up a molecule of water or transfer some of its atoms to another compound or any of a million different things.

A protein with such a surface is a catalyst and such proteins are called enzymes. The human body contains thousands of different enzymes, each of which catalyzes one particular reaction or one particular kind of reaction.

A protein formed at random by the chemical processes discussed in the previous article would have a vast number of different types of patterns on its surface. None of them might be suitable for any useful reaction. On the other hand, some of them might be.

It's like those multi-bladed pocket-knives that used to be fashionable; the ones that carried screw-drivers, awls, knives, scissors, corkscrews, files, can-openers and gizmos for taking pebbles out of horse's hoofs. If you had a job to do, you might find a blade that would do it and

you might not. The greater the number of blades and the greater the variety, the better your chances.

Well, with a nucleoprotein containing a million amino acids, the chances of finding a spot on the molecule where a reaction involving the splitting of glucose could be catalyzed were not completely negligible. And maybe another spot could catalyze the formation of an acyl mercaptan, and still another the formation of a high-energy phosphate.

It may be that millions of nucleoprotein molecules were formed before one was found with the proper surface patterns. Only that "proper" nucleoprotein molecule could develop the energy to form another nucleoprotein molecule and only that nucleoprotein molecule would be "alive."

We can see now that in order for a nucleoprotein molecule to reproduce itself it must break down appropriate molecules in the ocean about it; the complex molecules that had been built up by the action of the sun's ultraviolet to some point short of life. This would be the nucleoprotein molecule's "food."

And as the nucleoprotein molecules duplicated and reduplicated, the strain on the "food" supply would be ever greater. The ocean would begin to be scoured clean of complex organic molecules as some of them would be converted to simpler compounds for energy purposes and the rest would be built up into

nucleoprotein, these joining the ravenous horde and looking for food in its turn.

Eventually, an equilibrium would be reached. The nucleoprotein population would remain at a number where the rate at which the organic material was consumed would be just equal to the rate at which it was produced by the random effect of solar energy. Since the rate at which ultraviolet produced organic compounds was probably slow indeed, the nucleoprotein population of the ocean would have to be very low.

Furthermore, if things continued in that fashion, it would have to remain low for as long as life existed. Life would be only a rare phenomenon of the ocean surface—a scavenger molecule living on the occasional sugar molecule it happened to bump into.

To progress further than that, one thing was needful; the capacity for change; and that, fortunately, the nucleoprotein molecule possessed.

In the course of this series of articles, I have said several times that the nucleoprotein had the capacity of causing molecules of the simpler units that composed it to line up next to it until an atom for atom duplicate was built up. Each individual unit is probably lightly bound to the corresponding unit that forms part of the nucleoprotein molecule. The individual units are then knit together strongly and the new nucleoprotein molecule is released.

Now the nucleoprotein molecule doesn't want such a duplicate built up. It has no consciousness as far as we know and no desires. It is just that a symmetrical arrangement, like-next-to-like, is the stablest possible arrangement—due to something called resonance, which is material for another article another time—and therefore the most probable arrangement. However, the most probable arrangement is not that which occurs always; it is merely that which occurs most often. Occasionally, a less probable lineup of units occurs. At longer intervals still, a still less probable lineup, and so on.

For instance, if unit A and A' are fairly similar, it will happen once in so many duplications that an A' will line up next to an A in the nucleoprotein molecule. The resulting molecule will be an A' modification. When the modified molecule duplicates itself, an A' will line up next to the A' and another A' modification will be produced. In this way, different series of nucleoprotein molecules will be continually coming into existence.

Imperfect duplications are not the only changes that take place. The nucleoprotein molecules are being continually bombarded with the sun's ultraviolet and with cosmic rays and with gamma rays from radioactive materials. Every once in a while, a quantum of such radiation will strike a nucleoprotein molecule in such a way as to change the arrangement of its atoms somewhat.

If it remained still capable of duplication, it would duplicate this new arrangement.

In either case, when a nucleoprotein molecule changes its structure for any reason and passes that change on to its "descendants," the process is known as a mutation.

Now consider the mutated nucleoprotein. With a new unit in place, the pattern of atoms and charges on its surface is changed in at least one spot. Its catalytic properties may be changed if that one spot is a catalytic spot. It may be that it loses a vital ability as a result and can no longer develop the energy necessary to duplicate itself. In that case it is no longer "alive" and can serve only as food for its more fortunate companions. This is probably the result of most mutations.

Occasionally, though, a mutation occurring entirely at random, may actually improve the catalytic ability of a vital spot, or form a catalytic spot on the surface where no such spot existed before. Such a mutated molecule might have the ability to utilize its food more efficiently, use energy less wastefully, reproduce itself more quickly. Whatever it is, the new molecule may displace and crowd out the old ones.

You will notice that this is a form of molecular evolution exactly similar to the evolution on a larger scale with which we are familiar. (In fact, the evolution that leads from lizards to birds and from tree-shrews to man is just a reflection of the tiny molecular changes going on in

the nucleoproteins of the genes of these creatures.)

In what directions can this molecular evolution go? Judging from what we see about us now, one of the directions must have been toward the development of an ability for several nucleoprotein molecules to form a more or less permanent union with one another.

You can see the advantage of such co-operation. A single nucleoprotein molecule must be able to catalyze all the necessary reactions involved in self-duplication; all without exception. As soon as one ability was lost, the molecule was dead. If several such nucleoproteins banded together, the loss by one molecule of a particular catalytic ability was no longer fatal. The others in the chain still possessed it. Furthermore, as time went on, each gene might begin to specialize in certain of the catalytic abilities or even in one only and do that one with particular efficiency.

The more complex viruses that exist today may actually consist of as many as twenty-five nucleoprotein molecules—or genes, as we may now call them—in close co-operation. The human cell, it is estimated, has somewhere between two thousand and fourteen thousand genes.

Another direction in which molecular evolution took place was in the formation of a protective membrane about the nucleoprotein molecule—or molecules. In some way, the nucleoprotein molecule managed to collect a film of fatty molecules

about itself. This film was "semi-permeable"; that is, it let some molecules through and not others, depending on the size and chemical properties of the molecules.

For instance, such a membrane would not let protein molecules through and that made possible the invention of enzymes.

You see, the nucleoprotein molecule could reproduce itself only when all the necessary units were in line. But what if only a portion of the units could be found at a particular time? In that case, only a fraction of the molecule could be formed. It wasn't alive, this fractional molecule, and it just drifted away to be food for some other nucleoprotein molecule.

Yet this might easily represent a waste, since the portion of the nucleoprotein molecule that had been duplicated, might have been one of the catalytic spots.

Once the nucleoprotein molecules had surrounded themselves with a membrane, though, such incomplete fragments could not escape, and the fragments would serve as detached catalytic spots; as enzymes, in short.

In this way, the nucleoprotein would be able to "delegate authority." It would no longer have to do everything itself, but could create any number of enzymes to take care of the individual reactions that needed catalysis, while it alone remained "alive."

The cell nucleus, which is surrounded by a membrane separating it from the rest of the cell, and which

contains the genes, may be the direct descendant of these primordial nucleoprotein sacs. It is interesting to note that the cell nucleus—even of our own cells—is incapable of handling molecular oxygen. It has no enzymes fit for the purpose. It gets its energy only by glycolysis—as though it had evolved in an atmosphere that lacked oxygen.

All of this would increase the efficiency of life's use of what organic molecules could be found in the primordial ocean, but it wouldn't increase the supply.

In order for life to advance, the cells had to guide the formation of new organic matter. It had to make sure that such formation was not simply the result of chance collisions of sunlight and molecules. It had to trap the sun. It had to create a molecule which could absorb solar energy and transfer it to high-energy phosphate bonds.

The deed was accomplished. How long it took we have no way of knowing. The key molecule was chlorophyll, which is made up of a porphyrin ring system and a magnesium ion. The materials were common enough. The porphyrin ring system is very stable and was probably swarming in the primordial ocean just as were other stable organic molecules. And magnesium ion is one of the commonest in the ocean.

Apparently, then, a nucleoprotein molecule was formed through random mutation which could form an enzyme out of one of its catalytic

spots which could latch on to such a chlorophyll molecule and put it to use.

Any nucleoprotein sac that developed such an enzyme was fortunate indeed. All such a sac needed was water, carbon dioxide, certain simple ions and sunlight. This provided it with energy and all of this was inexhaustible. The nucleoprotein sacs required the drifting food of the ocean surface no longer and could multiply almost without limit.

But in order to do so, one more invention was required: cells. The nucleoproteins could form their own carbohydrates and fats now but once formed there was a tendency for them to drift away. To be sure, the nucleoprotein molecules might be content simply to fill the oceans slowly with food, as it had been filled in the beginning. Perhaps this was what happened at first, but obviously it is an inefficient process.

Then it must have happened that one sac developed a second membrane about itself, further away than the first membrane. Between the two membranes food might now be stored.

As the nucleus formed a glucose molecule it would travel out through the inner membrane into the space between the membranes. Or if the cell—as we may now call it—bumped into a glucose molecule floating in the ocean, that glucose molecule would travel in through the outer membrane into the space between the membranes.

In either case, in the space be-

tween the membranes, a phosphate group would be added to the glucose and its properties would be so changed that it could no longer cross the films again. It would be trapped within the cell. Once enough sugars were collected, they could be hooked together to form a starch molecule, and starch could be converted into the still more concentrated energy store represented by fats.

You see, by storing starch and fats, the cell could make sure it profited from its labors and didn't distribute the sweat of its brow, so to speak, over the vast reaches of the ocean.

Naturally, the outer portions of the cell, called the cytoplasm, had to possess enzymes with which to catalyze the reactions involved in forming starch and fat and breaking them down when necessary, too. For that reason, a new type of nucleoprotein molecule was developed which is characteristic of the cytoplasm and which can also duplicate itself and make enzymes.

The cytoplasm may have been developed after photosynthesis had continued long enough to place some oxygen in the atmosphere, because it is the portion of the cell that has the capacity to utilize molecular oxygen.

Chlorophyll-containing cells, which we may now call plant cells, multiplied extensively and filled the oceans once again with food—in the form of cells rather than of in-

dividual molecules. Cells without chlorophyll could now develop which could live, parasitically, on the food painstakingly stored by the plant cells.

Such animal cells, as we may call them, could engulf plant cells whole, strip them of the energy of their food content and build up their own store of carbohydrates and fats. They, in turn, could be the prey of still other cells.

Animal cells, making use, as they did, of plant cells, did not depend on the presence of light. They could spread into deeper layers of the ocean.

When plants invaded the land, they were tied to their roots, because they had to have a lot of water continuously. Animals let the plants worry about that, ate the plants, and developed independent locomotion.

Plants had to build up their food supplies slowly and were sessile, inert things. Animals broke down plant food—or other-animal food—rapidly and had enough energy to develop active muscles and nerves capable of concentrating electric charges and carrying sensory impulses.

That meant, eventually, the development of a nervous system, and of a brain. That, in turn, meant that some day intelligence could be achieved and a creature like man would evolve, a creature capable of wanting and trying to puzzle out how it had all come about.



THE DAWNING LIGHT

Conclusion. Norris, by force, by plotting, by economics and by thievery, drove toward his goal—to throw the Earthmen out! To discover, of course, that the Earthmen had been working toward that same goal even longer than he!

BY ROBERT RANDALL

Illustrated by van Dangen

SYNOPSIS

The world of Nidor had known only peace and stability for the first four thousand years of its recorded history. A firm priesthood ruled the

one-continent planet, and the pattern of life was serene and unchanging.

And then the Earthmen had come. They appeared from the sky, claiming to be emissaries from the Great Light, and the ruling priesthood

granted them the right to establish a School of Divine Law on Nidor. They did—and strange things began to happen. New ways of doing things emanated from the School, changing the set patterns of Nidor.

In the School's early days, one KIV peGANZ BRAJJYD touched off a minor economic crisis by his discovery of a new method of combating pests. Two generations later, his grandson, NORVIS peRAHN BRAJJYD, developed a growth hormone that would double the per-acre yield of Nidor's main crop, the peych-bean. Much to Norvis' astonishment, credit for this invention was willfully stolen from him by the head Earthman of the School, SMITH, and given to another. Norvis was expelled and forced to flee. After narrowly escaping death from stoning for blasphemy, he changed his name to NORVIS peKRIN DMORNO to give the impression that Norvis peRahn was actually dead.

Deeming it unjust that only the farms of the Elders should have the new growth hormone, Norvis, with the aid of a priest-bating old sea captain named DEL peFENN VYLESS, secretly made the hormone and distributed it to farmers all over Nidor.

The result was an economic collapse that took fourteen years to straighten out. The carefully-balanced economy was destroyed by a sudden doubling of the food supply, and Nidor fell into the Great Depression. Del and Norvis formed the

Merchants' Party, and by applying pressure on the Council of Elders they managed to restore Nidor's balance to a certain extent.

Once confusion is halted, the Party finds itself in difficulties. The Nidorians, too used to stability, are moving away from Del's rabid anti-priesthood stand and back to support of the Elders and the Earthmen. Norvis is still anxious to drive the Earthmen from Nidor and return to the Way of the Ancestors that had worked so well before their arrival.

The leaders of the Party come together to work out a plan. Aside from Del and Norvis, they are: KRIS peKYM YORGEN, the Party's strong man, a tall, broad-shouldered, handsome young man, who had been reared by Norvis and who shared the older man's burning hatred for the Earthmen; MARJA geDEL VYLESS, daughter of Del, a determined girl of keen intelligence; and GANZ peDEL VYLESS, Del's only son.

The conspirators seek something which will result in a panic that can be blamed on the Earthmen. Marja suggests the appallingly bold stroke of robbing the Bank of the Province of Dimay and accusing the Earthmen of the theft. Norvis and the others—without the knowledge of the absent Del—approve, and Kris peKym goes to Tammulcor, where he robs the unguarded bank with ridiculous ease.

He caches the haul—some eight million weights in cobalt—on the

offshore Bronze Islands, and returns to the Vashcor headquarters of the Party, where he learns that the entire province is in an uproar. With the metal backing for its paper money gone, Dimay's scrip is worthless—and Elder Grandfather Kiv peGanz Brajjyd, head of the Council, has refused to replace the cobalt. Grandfather Kiv's action was motivated by an anonymous note—actually sent by Norvis, who is, unknown to anyone, Kiv's grandson—which informed him that if he replaced the cobalt, the thieves would dump their holdings, thus reducing the value of money all over Nidor.

Kris peKym now returns to Tammulcor, accompanied by his devoted First Officer, a Bronze Islander named DRAN peDRAN GORMEK. Kris sets up an office and gains control over the sympathies of the people of Tammulcor by offering to redeem their worthless paper money with half as much good money of the Bank of Pelvasb. The Party's purpose in this has merely been to win popular support again in Tammulcor—but Kris, acting on his own, proceeds to lay the groundwork for a private project of his own, the destruction of the Earthmen. He is fearful of Del's opposition—but, just as he begins to explain his plan to a group of interested merchants, Norvis arrives from Vashcor with the news of Del's assassination.

This leaves Kris with a free hand, and he immediately assumes control of the Merchants' Party and begins

his planning in earnest. Marja and Ganz peDel, who had come with Norvis, form the nucleus of a new party command. Dran peDran, aided by BOR pePRANNT HEBYLLA, a longshoreman who had once attempted to rob Kris and had been helped by the very man he intended to rob, begins to train men. Nidor's first army is assembled.

Marja begins to work on the women of Nidor, convincing them that the Earthmen are demons by spreading rumors that they represent the Outer Darkness instead of the Great Light. Rumors are also spread that the Earthmen have hidden the missing cobalt on the campus of their School.

Kris himself has already taken care of that rumor by taking his ship up the Tammul River and actually planting the cobalt in a shallow grave on the School's property.

The rumor about the cobalt filters through to the Elders, and two priests, Grandfather MARN peFULDA BRAJJYD, Priest-Mayor of Vashcor, and Grandfather BOR peDEL SESOM, Priest-Mayor of Tammulcor, come to Kris, telling him that they are in agreement with Kris' plan to get rid of the Earthmen. They inform him that the Council, aware of the rumors about the cobalt, plans to question the Earthman, Smith, in a public hearing.

With a hundred armed men, Kris goes to Gelusar to attend the hearing—and, to everyone's astonishment and consternation, the bearded Earth-

man refuses to admit either the truth or the falsity of the rumor.

Kris takes immediate advantage of the situation, inflaming the crowd by telling them that he can lead them to the cobalt. He spurs a mob on to Bel-rogas, five miles away, and digs up the coins he has planted. The angry mob kills the students and priests and burns the School to the ground. The Earthmen escape by floating off into the sky, surrounded by shining blue auras.

Kris brings the cobalt back to the Square of Holy Light in front of the Great Temple of Gelusar, and dramatically hands the money to the Elders to return it to the Bank of Dimay. Now that the coin has been replaced, Dimay scrip is again worth full face value—thus doubling the Party's reserves, since they had bought up large quantities of the then worthless paper at half price.

Kris is hailed as a hero by the Nidorians. Norris, Ganz, and Marja come up from Tamimulcor to consolidate their position. Victory is seemingly in their grasp; with the Earthmen driven off and the people solidly behind the Party, Norris and Kris are jubilant. Kris is able to relax for a few moments. He spends some time with Marja, discovering that he hasn't been paying as much attention to the girl as she merits.

But before the moment of triumph is barely begun, Kris is summoned by the Council of Elders. They request that he come to the Square of Holy Light to receive his reward.

He arrives at the Square in full-

dress uniform, accompanied by his Hundred Men. But when Elder Grandfather Kiv peGanz begins to speak, the words are not what Kris expects.

"We have," the Grandfather says, "absolute proof that you were responsible for the burial of the money on the campus of the School. You have committed the foulest crime that has ever been done on Nidor. Therefore, I order your arrest on charges of sacrilege, blasphemy, murder, and high treason!"

Kris sees that he has been trapped. The acolytes and Peacemen who surround the Square are armed with rifles.

"We have you, Kris peKym," the Elder Grandfather says. "Surrender, or I'll have you cut down like a peach-bean at harvest time!"

PART 3

XV

"This place isn't fit for broken-down deests!" Kris roared furiously, banging on the door of the cell. No one answered. He listened to the echoing of his voice for a moment, scowled, and kicked the door angrily. "Guard! Guard!"

Again no answer. Kris turned away and dropped miserably on the hard bench running along one side of the cell. "Great Light give me patience," he muttered.

The cells beneath the Great Temple had never been designed for comfort. Normally, the big bronze

doors were left open, since the cells were designed for the penitential prayers of erring acolytes, but if it was necessary to close the doors, it could be done.

They were closed now, all of them. The Hundred Men had been jammed in, four to a cell, but Kris had been given a cell all to himself.

After a day and a half in the bowels of the Temple since the unexpected ambush in the Square of Holy Light, Kris was both miserable and furious. He had had no food, no one to talk to, not even a decent place to stretch his long legs.

The air in the cell seemed to be about half water vapor; the walls, although only slightly cooler than the steaming atmosphere, were dripping with condensation. A stream of tepid water poured out of a small pipe in the back of the cell and splashed endlessly into an open hole below it, thus providing both drinking water and sewage disposal. From above, a dim light filtered down through the tube, and only at midday was there enough light. The chimney was slanted at just the right angle to allow the Great Light to hit the floor at midday, so that praying acolytes who occupied the cell might make their proper devotions.

Kris shook his head at the thought of acolytes praying down here. How anyone could bring himself to stay in this dank place voluntarily was beyond him.

"Guard! Guard! Get me some food!"

His voice echoed down into the distance, but no one came. He had scarcely expected anyone, but he was determined to let them know from time to time that he was still down there and angry about it.

But if he was uncomfortable, what must the Hundred be suffering, jammed as they were four to a cell? Kris had no way of knowing; the walls were so thick that no sound had come to him in a day and a half.

He whacked his fist against the bronze door and roared again. "Are you leaving me to rot down here?"

This time, there was a sound in response—a scraping at the door that indicated that the bar was being raised. Then the door swung open. Air that was relatively fresh drifted in.

"It's about time," Kris snapped.

He watched as two rifle-bearing acolytes filed into the cell. Behind them came a third man, a young priest with a cast in one eye and a look of almost intolerable arrogance about his face.

"Where's my food?" Kris demanded.

The priest chuckled. "Food? Hah!"

The three stared menacingly at him, and for just an instant Kris thought they were going to execute him on the spot, without even the formality of a trial.

Then the priest gestured and said, "Come along, devil. The judges are waiting."

Kris hung back. "Am I to be tried?"

"It's the custom, before a blasphemer is stoned," the priest replied evenly. "Come, now."

The acolytes seized him roughly by the arms and pushed him to the door. They were small men, and ordinarily he could have flicked them away with two swipes of his hands. But they were armed, and there was little sense resisting. Even if he got away from these three, he'd never find his way out of the Temple alive.

Kris marched ahead of them, down a long, clammy-walled corridor, toward the steep, narrow stairway which led up to the Temple itself. For a while, he nursed the idea of running up the steps and getting away, but he realized that the men behind him could hardly miss, at this range.

As he started up the steps, he saw that they had been thinking a step ahead of him. Another acolyte stood at the top of the stairs, holding one of the three-foot psychknives that had been taken from his men. Even if the rifles had missed, he would never have gotten past that.

His face was unsmiling and hard as he strode down the upper corridor toward the main auditorium. Somewhere in the background, a bell was tolling solemnly. He didn't like the sound of that.

Once, when he was eight, he had attended a Passing Service in the Temple. It was a mass service, for those killed in the rioting after the

Psych Panic, and among those dead had been Kris' parents. He remembered the awe-inspiring solemnity of that service, the far-off shuddering of the great Temple gong and the low, constant murmur of priestly voices. It seemed to him now that he was marching steadily forward toward his own Passing Service, and the thought was not a cheering one.

He entered the auditorium. As he stepped over the threshold, a ringing voice cried, "Stand where you are!"

Kris stopped and looked up. On a dais at the front of the auditorium, the Council of Elders was arrayed in full panoply; sixteen stern faces glared coldly at him. Along the sides of the auditorium was an assemblage of priests, their blue tunics forming a solid wall down either side of the auditorium. In the center, a small, probably highly select, group of layman sat quietly.

Two small platforms had been erected at opposite ends of the auditorium, and a fierce light played down from above on each—not the Great Light, but an artificial illumination which hurt Kris' eyes.

One of the platforms was already occupied. A man stood bathed in light, arms folded, staring belligerently at Kris. Kris wrinkled his forehead, wondering where he had seen the man before.

On the platform, old Kiv pointed to Kris peKym.

"Show the blasphemer to his station!"

Guards and acolytes bustled around behind Kris, pushing him to the unoccupied platform. He ascended it and stood there, blinking in the harsh light.

"The trial shall now begin," Kiv said.

"Hold it!" Kris said loudly. His voice sounded harsh in his own ears. "Where are my men?"

"Your men are below," said the Elder Grandfather. "It is awkward to have all of them here at once—so you shall stand proxy for all!"

"I see. How convenient."

The Elder Yorgen stepped forward on the platform and delivered a long, rambling, and extremely solemn invocation. Kris listened to only the first few words, then let his attention drift away. He'd heard enough such speeches to know their general tenor.

The matter at hand was serious, though. He was in Grandfather Kiv's hands—and, battered as the Priesthood was, it could still muster enough strength to stone a hundred men quickly and quietly, before the populace knew exactly what was happening. The transition from adored hero to revered martyr would be a quick one.

Kris frowned. Had sacking Belrogas been a mistake? *No. The School had to be destroyed.*

But could they try him for it? Was there any proof that he, Kris peKym Yorgen, had actually led the onslaught? In truth, he hadn't—he'd merely brought the people there and shown them the buried money.

They had done the rest unbidden.

And this business of proving that Kris had planted the money at Belrogas. Could it be done? Kris knew his men were loyal; none would testify against him. In any event, the accusation was too fantastic to be credible, even though it happened to be true.

Then he stiffened. Did the Elders *need* proof? All they had to do was to put up a reasonably convincing prosecution and hustle Kris off the scene quickly. They could do to Kris what Kris had done to the School—squash first, answer questions later. Come what may, there was no more School now. Perhaps the Elders were figuring the same way—come what may, at the end of the trial there would be no more Kris peKym.

"The trial will now proceed," Grandfather Kiv said suddenly. Kris snapped his head up. "We charge you, Kris peKym of the Clan Yorgen, of blasphemy, murder, and sacrilege! How do you answer this charge?"

"I answer that the charge is false!" Kris declared. "Totally false!"

"We shall see," Grandfather Kiv said. "Let us hear the witness."

A priest came forward to the other small platform, stood in the glare of the light, and recited something to the mysteriously familiar man who stood there. The witness for the prosecution, Kris thought. Who is he?

Probably someone bribed to denounce me, he thought bitterly. Kiv doesn't miss a move.

They had him neatly penned, all right. Like a fool, he had walked straight into their ambush, and now they had him. Would his death crush the movement? He didn't know. Norvis was still at large some place, and Ganz peDel—but could they carry on alone? There was no certainty of that.

The priest finished administering the oath to the man in the testimonial box, and returned to his seat. Kiv, from the platform, said, "Stand forth and speak, Bryl pePrannt Hebylla!"

Of course! Kris recognized him then. It was Bor pePrannt's brother, who had been with Bor when the two of them had tried to hold up his office that day—so long ago!—when he was changing money.

"Tell the Council what you know, Bryl pePrannt," the Elder Grandfather said.

What does Bryl know? Kris wondered. And why would he betray a man who had befriended him?

"All I know, Ancient Grandfather, is what my brother told me. But my brother is innocent, Ancient Grandfather; he only did what this man"—he indicated Kris—"told him to do. He didn't know there was anything wrong."

"Never fear, Bryl pePrannt," the Elder Grandfather said. "Your brother will be freed."

So that was it! That was the dirty, filthy, underhanded trick they

were playing—letting Bor go free on the condition that Bryl talk! Kris felt his muscles tighten and his stomach seemed to be a cold lump within him.

"Well," Bryl said, without looking at Kris, "on the fourth night after the Feast of the Inner Light, my brother was with this man on board his ship, the *Krand*. They came up to Gelusar with the cobalt hidden in a false bottom of the ship. They went overland from the bend in the river south of Gelusar and took the money to the Bel-rogas School—"

"Mourn its holy name," a lesser priest intoned.

"Yes . . . uh—" Bryl seemed a little confused by the interruption, but the eyes of the Council were still on him. "Anyway, they took the cobalt and buried it on the School grounds and then came back to Tammulcor."

"Excellent," Grandfather Kiv said.

"Just a minute!" Kris shot to his feet. One of the acolytes standing nearby raised his psych-knife, but a signal from the Elder Grandfather stopped him.

"This man is a thief and a liar!" Kris shouted angrily. "What evidence do you have to back up this ridiculous story?"

"The evidence will be shown," Grandfather Kiv said coldly. "We have witnesses who saw the *Krand* come upriver with many deests on its deck—but we know that the ship never arrived at Gelusar. Also, we have the ship itself—and the double



hull has been found. That, I think is enough to substantiate the story Bryl pePrannt tells."

Kris felt as though he had been slapped in the face. The *Krand* captured?

"Do you call that evidence enough to stone a man?" Kris asked loudly. His voice was still as firm as ever.

"It is," said Grandfather Kiv. "It is, and more than enough. But we have still more." He turned toward his left and called out: "Bring in the other witnesses!"

A group of acolytes appeared, bringing with them four men—members of Kris peKym's own crew. Kris sat down slowly.

The Elder Grandfather addressed the four crewmen. "As you have been told, it is no crime to follow the orders of your captain. Indeed, to fail to do so is mutiny. But it is one thing to commit a crime because you were ordered to do so, and another to comply freely with the act. To fail to testify here would indicate that you condone your captain's actions, that you deserve the same death as he does—stoning.

"Your testimony, however, will indicate to us that you were merely following orders and are, therefore, innocent of any crime. Will you testify?"

The sly snake! Kris thought. Loyal as they might be, what else could they do in a situation like that but spill everything? A bath of cold perspiration spangled his fore-

head as he saw now that there was no way out for him whatsoever.

The answer of the four was pure formality. It was obvious to Kris that they had already decided to tell the Council what had happened.

They did. One by one, they climbed into the testimonial box and told their stories. This time, unlike Bryl's testimony, they were questioned for detail. They gave detailed and explicit answers.

Kris could see the whole pattern. Bryl had come to Gelusar somehow—maybe he had blabbed what Bor had told him—maybe he'd thought he could get paid—maybe a lot of things—

And the shrewd old man had used Bryl's worthless, undocumented testimony to club the crewmen into giving testimony that was far from useless. It clinched the case against Kris peKym Yorgen perfectly. Like a meat-deest being led to the butcher's, like a psych-stalk under the farmer's knife, Kris peKym would be put to the stones.

When it was all over, the Council conferred for a few minutes. Then Grandfather Kiv peGanz Brajjyd rose ominously and said, "Have you anything to say before sentence is given, Kris peKym Yorgen?"

Kris stood up slowly. "Yes, Elder Grandfather, I do." He turned and looked at the hushed crowd in the auditorium. "The Council will condemn me to death. I will die for what I have done. But let me tell you this: they have condemned me

because they are still under the influence of the devil Earthmen, the demons of the Outer Darkness. They condemn me, but I do not condemn them—they have already condemned themselves far beyond anything I could do or say."

Then, as the crowd began to whisper, he turned back to the Elder Grandfather. His hand jabbed out in a sharp gesture. "And I tell you, Elder Grandfather, that for this day's work, the Great Light Himself will condemn you even more than you have already condemned yourself."

"I stand ready to assume responsibility for my deeds," Grandfather Kiv said. "May the Great Light deal with me as I deserve, if I have erred this afternoon." He drew his robes solemnly about him. There was a long, tense, crackling moment of silence.

"Kris peKym Yorgen, we, the Elder Grandfathers of the Sixteen Clans of Nidor, in Council assembled, find you guilty of the multiple crimes of sacrilege against the property of the Great Light, blasphemy against the Great Light, and high treason against the governors appointed by the Great Light. As the Law of our Ancestors dictates, you and your men shall be stoned to death at firstlight tomorrow. We speak in the Name of the Great Light."

The blazing twin lights from above winked out suddenly. The trial was over.

Norvis peKrin Dmorno brought his deest pelting up the road toward the Great Temple, and reined the animal up and tethered it near the Temple wall in the Square of Holy Light. He dropped off, tired, and leaned against the panting animal's side for a moment, recovering his energy.

It had been a hard ride, down to Tammulcor and back—but it had been necessary, in order to save Kris peKym. Norvis had made the journey to the southern port in what must have been record time, despite the nuisance of having a deest die under him en route.

Outside the Temple, he encountered a boy passing by, and stopped him.

"Tell me, boy—how did the trial of the blasphemer go today? I've only just arrived from Tammulcor."

"Found guilty, Old One," the boy said. "Guilty and sentenced to die at firstlight tomorrow. The trial just ended a few minutes ago."

"Thanks," Norvis said, and walked on without bothering with the formalities. He entered the Square of Holy Light and looked around. The place was deserted, here in the dim light of late afternoon.

Firstlight tomorrow, eh? Quickly he computed the various spans of time. It had been a little more than a day and a half since Kris had been captured; a little less than a day and a half since Norvis had made his

mad ride to Tammulcor to rouse Ganz peDel and the army.

Ganz and his men would be coming up the Tammul as fast as they could make their obstinate ships move; they would be in Gelusar in a few hours—certainly long before the scheduled time of the execution. In the meantime, Norvis knew he would have to move quickly.

The trial, Norvis thought, had ended not unexpectedly. Kris was a menace to the Council, and they were happy to be rid of him. Norvis paused on the first step of the Temple, planning what had to be done.

Kris was too important to lose. As a focal point for the rebellion, he was indispensable to the Party. And therefore, steps would have to be taken to save him. Norvis fingered the pistol concealed in his robe and slipped silently into the quiet Temple.

An acolyte stepped forward in the half-darkness.

"May the Great Light illumine your soul," the acolyte said, in ritual greeting.

"And yours," Norvis said crisply, averting his face. "I am here to pray." He indicated a small chapel to the left.

"Very well," the acolyte said.

Norvis entered the chapel. A small lens glittered above. He bowed his head, but no prayers would come. After a few minutes, he rose and looked around warily. No one was in sight.

No one had seen him, either, but

the one acolyte—and in this darkness, he would not be recognized. Wrapping his tunic around him, he edged out of the chapel and toward the darkened staircase.

There was the sound of closely-harmonic chanting in the distance as Norvis tiptoed up the stairs toward the private office of Elder Grandfather Kiv peGanz Brajjyd.

Norvis knocked once, lightly, and there was no reply. *The old man doesn't hear too well any more*, he thought, and knocked again.

"Come in, come in!"

Norvis pushed open the door and stepped through. The old man was sitting behind his desk, glaring steadily in the general direction of the door. It was evident that Kiv's sight was none too good either.

It was hardly surprising. Norvis himself was close to forty; Kiv was probably more than twice his age. The pistol under Norvis' arm suddenly began to burn coldly against his flesh.

"The Peace of your Ancestors be with you, Grandfather," Norvis said.

"May the Great Light illumine your soul, my son."

Norvis stepped closer and bowed. "My name is Norvis peKrin Dmorno, Grandfather. I know I'm not of your clan, but—"

"What is it you want?" Kiv asked impatiently. "How did you get here unannounced? You're one of those Merchant people, aren't you?" Irritably, Kiv began to re-

arrange papers on his cluttered desk.

"That's right, Grandfather. I'm here to ask for the release of our Leader, Kris peKym Yorgen."

"*What!* Here to plead for the life of a condemned blasphemer!" Kiv was fiery, animated now. "Out! Away from me!"

"Just a minute, Grandfather Kiv peGanz," Norvis said quietly. He felt almost numb, now, as he watched the silver-bodied Elder rage at him. "Don't be hasty, Grandfather. You know what the Scripture says about haste. 'He who—'"

"Out!" Kiv stormed. "Guard! Guard!"

The gun at Norvis' side was like a stone strapped to his body. He took three quick steps forward and laid his hand lightly on Kiv's wrist.

"Do you remember your daughter, Ancient One? Sindi iRahn Brajjyd?"

"Eh?"

"Your daughter . . . your daughter had a son, *Grandfather*."

The inflection of that last word was unmistakable. Kiv turned, stared dimly at Norvis for a moment, pulled his arm from the other's grasp, and sat down, staring at his fingertips.

"*Grandfather?*"

"My name is Norvis peRahn Brajjyd," Norvis said. It was the first time he had uttered those words in almost fifteen years, and they sounded strange in his throat. "Do you remember me, Grandfather?"

Kiv seemed to grow even more shriveled as Norvis watched. His

lips moved uncomprehendingly. Finally he said: "Norvis peRahn was stoned to death fourteen and more years ago."

"Norvis peRahn escaped. Norvis peRahn dove into the waters of Shining Lake and fled down to Tamulcor, where he climbed back into his convenient alias of Norvis peKrin Dmorno—under which colors he's been riding ever since."

Kiv let the words sink in. "But why?" he asked blankly. "Why have you hidden your name, your—" He shook his head. "Are you Norvis peRahn?"

Norvis folded his arms. "I entered the Bel-rogas School of Divine Law some twenty years ago, the fifth of my family so to do. The first was someone named Kiv peGanz Brajjyd—and his wife, Narla iKiv. My mother and father both were students there. I, too, hoped to graduate from the School, and continue my work in genetics. Unfortunately"—his lips curled bitterly—"I became, instead, the first student ever to be expelled from Bel-rogas. Does this sound like your defunct grandson, or doesn't it?"

"It does," Kiv admitted. "But—"

"But why? Because I'd be dead for real if I hadn't hidden my true identity. Who do you think was responsible for selling that growth hormone all over Nidor?"

"Norvis peKrin—Norvis peKrin and the other one, the sea captain. And all the time it was you!" Kiv's voice was still questioning.

"Exactly. We were duped by the

Earthmen into distributing the stuff widely. Our movement has not been wholly successful all the time."

Kiv shook his head bewilderedly. "But . . . why have you come here, Norvis?" He seemed still unable to comprehend the fact that his grandson could still be alive after all.

Norvis walked around behind the desk and put his arm around the withered old man. "I've come to warn you against your mistakes, Grandfather."

"Mistakes?"

"You've placed your trust in the Earthmen, Kiv peGanz. I did, too—for a while. Until Smith betrayed me, and I learned the Earthmen are devils come here to destroy Nidor."

"I've heard those words before," Kiv said softly.

"You've never thought about them," Norvis said. "Let me illumine your mind, as the timeworn expression goes. Let me scrape some of the scales from your eyes."

"Harsh words from a young man," Kiv said.

"We're past the point of formality now, Grandfather. Listen to me—*listen*, for the first time in your eighty years. Listen!"

"Very well," Kiv assented. There was little fight left in the old man now. "I'll listen."

"Do you remember my expulsion?" Norvis asked.

Kiv nodded. "I wish I could forget it."

"And I. It nearly killed my mother, and the stain of it is still on

the Brajjyd name. Do you know *why* I was expelled?"

Kiv searched his memory. "Some scene you made at a public ceremony, wasn't it?"

Norvis nodded. "I had been studying genetics under Smith, the Earthman. After a year of hard work, I had developed a growth hormone. With the connivance of the Earthmen, the invention of the hormone was credited to a thoroughly worthless young man named Dran peNiblo Sesom—long since deceased."

"What happened to him?"

"He was lynched when the hormone he supposedly invented wrecked our economy. It was a fate I escaped, through the good offices of the Earthmen, who were kind enough to heave me out of the School and put the credit or blame—on Dran peNiblo."

"You say you were expelled falsely?" Kiv repeated. "I believe you raised that charge at the time."

"And how often have you heard it since, from men thrown out of the School for no good cause? The Earthmen have been following some mysterious plan of their own, Kiv peGanz—one that necessitated my expulsion. They're secretly working to destroy Nidor!"

"You and your friends have said that many times," Kiv objected. "You used it as an excuse to steal cobalt, plant it on the Bel-rogas grounds, and destroy the School—a crime for which your hotheaded young friend will die tomorrow."

"Kris will not die," Norvis said.

"Is that the Light's Truth?" said Kiv sarcastically.

"It is. You will free Kris to continue the fight against the Earthmen."

"The Earthmen are gone," Kiv said.

"They are not gone. *They are biding in the Mountains of the Morning, biding their time.* Once you've removed Kris from their path, they will reappear—and destroy us all!"

"Hiding? What madness is this?"

Norvis grasped the old man's arm—*dry, like an old stick*—and peered into his deep-set eyes. "Remember, Grandfather, when my mother Sindi crossed the Mountains of the Morn, following my father, Rahn?"

"I remember," Kiv said.

"She returned—after a slight delay en route. In the Mountains of the Morning, there is a secret place where the Earthmen stay. Sindi saw strange and wonderful things there—the strangest of them being the Earthman Jones, supposedly gone to the Great Light some time before."

"*Jones?*" Kiv was openly incredulous. "How do you know all this, boy?"

"Sindi told me of it," said Norvis. "Of the Earthmen and their strange machines and weapons, out there in the Mountains. I have never forgotten it."

Kiv put his head in his hands. "I'm old, Norvis. I don't understand

all these conflicting stories. What are you trying to tell me?"

"I'm trying to tell you," Norvis said, "that the Earthmen have been aiming for Nidor's destruction ever since they came here. That the students of the School have been carefully trained to sow havoc among us. You with your well-meant method for wiping out crop-eating pests, that caused a mild panic sixty years ago—and incidentally helped to put a large-sized crack in our social framework. Me, with my growth hormone. You can almost detail the step-by-step way in which the Earthmen have undermined us."

Kiv said nothing, but merely closed his eyes wearily.

"The Earthmen are still here," Norvis continued relentlessly. "Waiting to perform some new wickedness. And by taking Kris peKym from us, you'll be removing the last obstacle in their way."

Kiv opened his eyes suddenly. They glinted beadily at Norvis. "How do I know what you say is true?"

"Will you *never* believe anything?" Norvis demanded, exasperated. "I swear that all I've told you today is as true as that book you see there"—he indicated the Scripture and the Law. "I swear by the honor of my mother, Sindi iRahn, by my father, by the Scripture and the Law, by my true name of Brajyjd, by my Ancestors, and by the Great Light Himself that I have not lied to you. I—"

"*Enough!*" Kiv said hoarsely.

His face was pale, and Norvis saw that the old priest's breath was coming in heavy gasps. "For sixty years—ever since my days at the Bel-rogas School—I have co-operated with the Earthmen. Not since my days at Bel-rogas have I doubted the rightness of what I have done—and my doubt was only momentary."

Kiv seemed to sag. "And yet," he went on, "if what you say is true, then I have done more to aid the Earthmen than any other single man." His head slipped lower. "I have betrayed my people and my world—if what you say is true."

"Can you still doubt me?"

"I don't know," Kiv said. "Your oath . . . but—"

"Free Kris peKym!" Norvis said inexorably. "Free him!"

"Norvis! How can I?"

"Free him?"

Kiv rose from his seat and wiped trembling hands over his brow. A tremendous inner struggle seemed to be going on in him.

"You *couldn't* have lied to me, Norvis. And yet—"

"Face the truth, Kiv peGanz!"

Kiv stood still for a moment. Suddenly, he uttered a little moan and slumped to his seat, his head falling forward over his desk. He moaned again—once—and was silent.

Norvis caught his breath. It had not been necessary to use the pistol, after all. It was just as well this way.

He glanced down at the body of

the aged priest. For just a moment, a tear glistened at the corner of Norvis' eye. Angrily, he wiped it away, and started for the door.

There were footsteps in the hall, and then a tapping at the door. "Ancient Grandfather?" a voice said.

Norvis stopped, cursing himself for a fool. It was the first time in fifteen years that he had exposed himself to physical danger, and here he was, in a jam again.

"Ancient Grandfather?" Again the knock—louder this time.

Lightly, Norvis ran to the window and looked down. Below was the roof of the auditorium, and in its center was the great lens that focused the rays of the Great Light on the altar. Across from him was the gong tower. The wall was carved intricately; Dran peDran had been able to climb it easily.

But Dran peDran was a younger man; Norvis hadn't climbed the rigging of a ship for—by the Light! It was nearly twelve years! He realized suddenly that he had become middle-aged. His muscles were flabby from years of sitting behind a desk.

"Ancient Grandfather!" A pounding on the door.

There was nothing else he could do; if he were caught, everything—*everything* would be ruined! He swung himself over the window sill and began to work his way down the carved wall. He was less than ten feet down when he heard the door



open in the Elder Grandfather's office.

Someone, an acolyte probably, came into the room. Below, Norvis hugged the wall.

"Grandfather? Grandfather! *Grandfather!*" A silence for a moment, then the fast patter of retreating sandals.

Moving as rapidly as he dared, taking advantage of the late afternoon dusk, Norvis went on down the wall. He dropped the last few feet, wincing as the shock of hitting the ground flashed through his legs, and ran across the roof toward the rear of the Temple. He felt a touch of panic, hard to suppress. There was still a chance he might be caught.

He swung himself over the edge of the roof, and, for a moment, his feet touched nothing. Then a sculptured gargoyle came within reach. He grasped its grinning head and eased downwards. His fingers slipped, and he dropped nine feet to the street below.

His legs took the second shock poorly; his ankles felt sore from the wrench they had been given. But he didn't dare limp. Gritting his teeth, he walked quietly down the deserted street to the corner, and then turned and walked to where his deest was tethered. His face a wooden mask that concealed searing pain, he hoisted himself aboard the animal.

He turned it toward the south, moving slowly so as not to attract attention. As the deest began to

move, he heard a sudden shout behind him.

"He is dead! The Elder Grandfather is dead!"

Norvis glanced around. It was not an acolyte who shouted; it was one of the lesser priests, standing at the door of the Temple.

Then the great gong sounded—and sounded again. Norvis urged his mount forward, and the deest trotted quickly through the Square of Holy Light toward the south. And as he rode, through the night-darkened streets, Norvis peRahn Brajjyd heard the gong ring hollowly again and again over the Holy City, sounding the death knell of his grandfather.

XVII

Once out of the city, Norvis took the Tammul Road toward the river; the ships from Tammulcor should be coming in any time now, commanded by Del peFenn's son, Ganz peDel. The ships would have to be stopped. Things had changed now—and, much as Norvis hated himself for thinking it, changed for the better.

He had gone up to the old man's office to do murder, if necessary—and found that he couldn't, and that it hadn't been necessary. He knew he could never have pressed the trigger on the old man. Fool old Kiv peGanz had been, but he had been an honest fool—and honesty, while it was not a trait Norvis could claim for himself, was one that he respected.

Norvis pulled up at the turn of the road at the great arch of the Bridge of Klid. There was only one way he could stop Ganz's fleet. The river was over a mile wide at this point.

He guided his mount toward the bridge. At the far end, there would have been Peacemen a few days ago, but now that the cobalt had been recovered, the bridge was free again.

Norvis went to the center of the bridge and waited, hoping that the ships would be visible in the glow of orange spread by the torches on the bridge.

A few deest-mounted men trotted by, paying no attention to the man who stood by his mount and stared downstream toward the south. Pedestrians plodded by, some silent, some talking in low tones. All Gelusar and the country surrounding seemed to be hushed.

One man, obviously more than a little drunk on psych-beer, stopped by the rail of the bridge near Norvis.

"Did you hear? The Elder Grandfather is dead. Not too long ago. The old man was wrong, I guess."

Norvis glanced at him and then looked again downstream. The nightly rain had begun by now, and he felt cold and chilled.

"He said this morning," the drunk continued, "that if he was wrong about Kris peKym, the Great Light would kill him. And now he's dead! Bet *he* was surprised!"

Norvis turned to him again. "Keep a civil tongue, you souse, or I'll take great pleasure in throw-

ing you into the Tammul with an anchor to keep you company!"

The man blinked. "All right, all right. Sorry." He went on across the bridge.

It was another five minutes before Norvis saw the masts of the *Vyothin* sliding toward him in the darkness. The ship, he saw, would pass under the bridge fifty yards away. Norvis urged his deest along the bridge.

Without paying any attention to whether or not there was anyone watching, he climbed over the rail and hung by his hands from the bracing beams of the mile-long bridge. Just as the *Vyothin's* mast passed beneath him, he let go and dropped toward the arm of the main skysail. He grabbed it. The sail was moist from the night rain, and his hands slipped a few inches, but he held on, nearly wrenching his arms out of his shoulder sockets. Then, slowly and painfully, he began to climb down the rigging toward the deck.

The man in the crow's nest had seen him, of course. He sung out: "Who's there? Who was that just dropped?"

"Me," Norvis called weakly. "Norvis peKrin Dmorno. Tell Ganz peDel I'm here."

Several minutes later, he was in Ganz peDel's cabin.

"I'm getting old," Norvis said, smiling a little. "Ten years ago, I could have done that without taking a deep breath."

Young Ganz peDel shook his head. "I'm sure *I* wouldn't have done it. Kris peKym might have the nerve, though."

Norvis shrugged one shoulder. "No matter. That's not important anyway. The point is, we've got to get Kris out of the Temple—and I think it's going to be easier than we thought."

"I don't understand how the Grandfather's death changes anything," Ganz peDel said. "All we have to do is get our men inside the Temple, as if we are praying. Then someone can sneak down and—"

"Hold it, son," Norvis said, raising a hand. "You're forgetting something. The Elder Grandfather specifically stated, in public, that if he had erred the Great Light would deal with him. Well, he has."

Ganz nodded. "I get it. The people now are going to realize that Kris must have been right all along. We won't have to sneak; we can attack the Temple openly!"

"Right. Absolutely right. But it also means we'll have to stir up popular support. That's why I had to stop you—if you'd just charged in there, you might have gotten Kris out, but it wouldn't have endeared us to the people. This way, we'll have the people on our side before we make a move."

"Good," said Ganz happily. He stopped pacing the floor of his cabin. "By the way, how is Marja?"

Norvis looked blank. "Why . . . I suppose she's all right. She was at the hotel when I left yesterday, and

I haven't been by there since." He looked up at Ganz. "Why? Are you worried about your sister?"

"Not really," Ganz said. "She can take care of herself."

"Right enough," said Norvis. He paused and sat up straight. "Wait! What's that?"

Ganz frowned a little. "I don't . . . oh, yes—"

From somewhere just ahead of the ship came the sound of a peculiar, angry, buzzing murmur. Both men scrambled up the ladder to the deck.

Norvis reached the deck first and peered out, looking around. At Gelusar, the Tammul River widens into the Gelusar Basin before it narrows again to flow on to Tammulcor and the sea. At that point, the Tammul is nearly two miles across. On the western side of the river, where Gelusar lay, were the docks for the river packets and the other vessels that came up from the south.

The *Vyothin*, followed by the *Paleth* and the *Garn*, had sailed into the Gelusar Basin and moved toward the docks. The *Vyothin* was less than five hundred yards offshore as Norvis and Ganz came on deck. There were torches blazing on the dock, and a huge crowd was gathered there, screaming and shouting.

"What in the name of—what's going on?" Ganz asked.

"Looks like a gathering of some kind," Norvis said sarcastically. "Maybe a garden party."

"Or a riot?"

"Or a riot," agreed Norvis. "Better move in slowly; we don't want

to get caught in anything nasty."

The *Vyothin* drifted westward toward the docks. Soon, the men on deck could make out what was happening. Norvis could see someone standing on one of the high pillars facing one of the docks, and the crowd was cheering.

"The *Vyothin*! Hoy! Hoy! And the *Paeth*! And the *Garn*! Hoy! Hoy!"

And then the figure on the pillar waved its hands, and a familiar voice rang across the water.

"Yes! Here they come, just as I told you! The devil-influenced Elder is dead because the Great Light killed him for condemning Kris peKym to die! And now his friends—your friends—*our* friends—have come to rescue him from the dungeons!"

"Hoy! Hoy! HOY!"

Ganz turned his head to look at Norvis. "By the Rays of the Light," he said softly. "It's Marja!"

There was little need to stir up popular support for the rescue of Kris peKym Yorgen. The news had spread quickly over Gelusar that the Elder Grandfather was dead, and Marja geDel Vyless, with a woman's eternal faith, had taken advantage of it by telling everyone that it proved Kris' innocence, and that his friends would come to get him out of his dungeon. She had known that Norvis had gone after her brother, and had estimated the time of arrival pretty closely. When the ships pulled in, she had already

organized a full-fledged army, ready to march on the Temple to demand the release of Kris.

Norvis and Ganz were the first men off the ship. The crowd looked ugly, but Marja seemed to have them under control. Her face was positively radiant with fury, love, hatred, and joy—a bower of emotions which seemed to flicker across her face as though they were competing for domination. Norvis hadn't realized a woman could look like that.

She pointed a finger at them. "There they are! I told you they'd come! Are you ready to save the Blessed Kris from a martyr's death? Are you ready to save him from the minions of the devil-influenced Elder whom the Great Light has struck dead for his unrighteousness?"

The cry rose from a thousand throats. "Yes! Save him! Save him!"

Norvis tried to push his way through the crowd and shut the girl up. The crowd gave way, but not rapidly enough.

"Once before," she went on, "the people of Gelusar rallied against evil and drove off the Earthmen! Tonight, we must rally and cleanse ourselves of the last vestige of evil!"

There was more cheering. Norvis jabbed viciously to the right and left with his elbows and finally got through to her. The thing might get out of hand. He wanted to rescue Kris, but not quite this way.

But before he could say anything, Ganz had taken his sister's hand.

"Marja," he said softly, "you're magnificent! You reminded me of Father up there!"

"It wasn't Father I was thinking of," she said. "It was Kris. I didn't know if you'd make it or not, and I wasn't going to let him die."

Norvis stepped back and let some of the tenseness seep out of him. It was too late. Events would have to move of their own accord for a while, until they could be brought back under control.

Ganz turned and looked at him. "On to the Temple?"

"On to the Temple," Norvis said. "Where else?"

Ganz lifted his head and shouted through cupped hands to the men on the ship. "*Hoy!* Hoy, aboard ship! Get your weapons out! Down and off! The people of Gelusar are with us! Let's march!"

XVIII

The acolytes and priests at the Great Temple of Light were not unprepared for what was to come. They had heard the rumors that had flitted through the city in the last hour or two since the Elder Grandfather had been found dead, and they remembered all too well what had happened to the School of Divine Law.

The doors of the Temple were barred; there were men on the roofs and stationed in the towers, armed with rifles, and there were men on the lower floors armed with great

knives, ready to defend the Temple against any onslaught.

Nor were the priests the only ones who were prepared to fight for the Holy Ground. Citizens from everywhere who had heard of the uprising gathered in the Square of Holy Light. They had not heard Grandfather Kiv's fulfilled curse on himself; they knew only that the Temple was under attack.

When the mob surged into the Square, they met armed resistance. Hands locked together, the townsfolk blocked the way. Psych-knives swung, rifles coughed from the roofs. Men dropped, bleeding and dying.

And still the invaders of the Square swarmed in through the three streets that led to it. Those who were in front were pressed ever onward by the relentless masses behind. Within fifteen minutes, the Square was slippery with blood, and the dead and dying were stumbling blocks for those who still fought—and as yet the Temple had not been touched.

Norvis, Ganz, and Marja were elsewhere. Norvis had finally persuaded the young hotheads that a frontal attack on the Temple, although it would be useful as a diversion, would not be the most direct way of releasing Kris. While the battle raged in the Square, the crews from the ships worked their way around to the rear of the Temple.

"Let's keep it quiet, men," Ganz said. "We'll come up from be-

hind. They'll never know what hit them."

At the rear of the Temple was a narrow street, the same one down which Norvis had fled not too long before. It was watched by the priests; there was no chance of simply walking up that alleyway and taking the Temple easily. But Norvis had a plan.

A block to the rear of the Temple, he pointed to a two-story business building. It was dark, but in the gloom they could see a sign that read:

MEGIL & peMEGIL
FINE POTTERY
AND DISHWARE

"The back of this building faces on the rear of the Temple," Norvis said. "Ganz, you take a group to the roof and get the priests' minds off the alleyway below. You'll be one floor above them, so you'll have an advantage. They'll have to look up to shoot, so they won't be watching us.

"The rest of us will get through the window at the rear of the pottery shop and take the rear doors of the Temple. Get it?"

"Got it."

"Good. Let's go."

With the butt of a rifle, Norvis smashed in the door of the shop and the men surged in. Dishes and vases were scattered as the crewmen of the three ships plunged into the blackness of the pottery shop.

One of the men struck a torch

and held it aloft. He pointed toward the back of the store. "There's the stair to the top!"

The torchlight glittered on broken fragments of blue and red and gold and green glazeware that lay in shards on the floor.

"Watch that torch!" Ganz said. "Put it out before we get to the top, or they'll spot us! *Vyothin* men, come with me! The rest of you follow Norvis peKrin!"

Ganz headed for the stairway, followed by the crew of the *Vyothin*.

"The rest of you come this way!" Norvis said. "And watch that pottery! Do you want to wake up the whole neighborhood?"

The men laughed, relaxing a little. The battle that still surged back and forth in the Square of Holy Light would drown out any noise that the crewmen could possibly make.

Norvis led them to the rear window. It was shuttered, and Norvis slid the bolt. "Now be quiet. I mean it this time. If the priests suspect we're down here, we're lost. They know by now that we're in this building, but since there's no door, they won't be looking down here unless we're too noisy. So shut up."

He eased the shutter open a crack and looked up.

"What's going on?" someone said.

Norvis jerked his head around. "Marja! What in the name of Darkness are you doing here? Get back! This is men's work!"

Marja said a single sharp, vulgar word. "If you think I'm going to stand around and do nothing, you're wrong. You can tell Ganz what to do, but you'll not keep me from Kris!"

Norvis wavered for a moment. He could order the men to take her back, but that would only create confusion. He cursed softly, then said: "All right. You stay. I'll treat you like a man—but you'd better obey like a man. Is that clear?"

"Yes, Old One," she said crisply.

By this time, Ganz and his men had reached the roof. There was a rattle of rifle fire, which was immediately returned from the roof of the Temple. Then, for a moment, there was silence.

Norvis gritted his teeth at the stupidity of Ganz's men and Ganz himself. The dumb sons of deests had all fired at the same time, a broadside into the priestly ranks. It had undoubtedly been effective—but now they had to stop and reload, giving the priests a breather that staggered fire would have averted.

Oh, well. Some men could reload faster than others. It would even itself out shortly.

The men behind him were growling impatient, but there was nothing Norvis could do but wait. Soon, the fire from the roof of the pottery shop began to form into a staggered pattern. And then Norvis heard an odd sound. It was a regular *thump! thump! thump!* that echoed around the streets that led to the front of the Temple.

It was drowned out for a moment by a loud, clarion ring from the Temple gong as a bullet struck it.

Then Norvis recognized the thumps. The mob at the front was battering at the door. He'd have to move fast.

He turned to Marja and whispered, "You and I will go first. We'll jump out of the window and run across the alley to the rear door of the Temple. If your brother keeps up the good work, no priest will dare lean over and try to shoot us. Don't try to get inside yet, though. Wait till I tell you." Then he flung open the shutter. "Let's go."

They leaped and ran. Not a shot was fired downward until long after Norvis and Marja were safe beneath the wall.

Meanwhile, the others were streaming from the window. It was less than thirty feet across the street, and the first few men made it safely. Then a priest saw them from above, and began firing at the window.

Three men dropped, one after another.

"There's enough of us here!" Norvis called. "The rest of you go upstairs and help Ganz!"

Then he turned to the men around him. "We're going in this door," he said. "There are probably men behind it, but if the main doors are being assaulted as heavily as it sounds, there won't be very many. All of you aim your weapons at the door. When I push it open, wait for my signal, and then fire."

He reached into his vest and pulled the heavy pistol from his belt. There was only a small bolt on the door; the Temple hadn't been built with the expectation of an armed assault.

Norvis stared at the door. Once, many years ago, he had been taken through the Temple by a friend of his mother's, Yorgen peBor Yorgen, whose father's father had been the Elder Yorgen. Norvis had only been ten at the time, but for some reason the fact stuck in his mind that the bolt had been at Yorgen peBor's shoulder height.

He lifted the pistol, pressed it against the door, and pulled the trigger. The resulting explosion almost tore his arm off.

"Hoy!"

He had never tried that trick before, and he had no idea of what pent-up gases from exploding gunpowder could do. His hand was numb, and the pistol was ruined, but the door swung open of its own accord.

There were two acolytes in the narrow hallway. Waving his useless pistol, Norvis ordered harshly, "Shoot them!"

The acolytes had just enough time to look startled before bullets ripped into them. The small group of sailors moved on into the darkened hallway, heading toward the dungeons. At the front of the Temple, the frantic assault continued noisily.

XIX

In the blackness of his unlighted

cell, Kris peKym Yorgen stood just beneath the air chimney that led to the roof of the temple, his head cocked to one side to catch the sounds that drifted down from above.

What in the Name of the Light was going on up there, anyway? An occasional *crack!* of rifle fire was recognizable, but the murmuring and rumble in the background was hard to make out.

A mob again? It didn't seem likely. With all that damning evidence marshaled against him and his guilt proven beyond doubt, it wasn't likely that any of the people would still be on his side. The people all knew he had framed the Earthmen; why would they help him now?

The idea that Norvis might be storming the Temple to rescue him seemed just a little fantastic, but it was the only explanation he could think of. If it were Norvis, he thought, then there wasn't much chance of a rescue. A surprise move might have done it, a quick lightning swoop—but it sounded as though the populace had been aroused, and, if so, the few remaining loyal members of the Party would not last long against their fury.

He cursed bitterly. If only he could get out of this cell!

He heard noises reverberating faintly through the bronze door, and whirled quickly. If there were someone coming to rescue him, the priests might think it wisest to kill him

now, instead of waiting until morning.

He walked quickly to the door of the cell and felt around. The cell was just narrow enough for what he wanted to do. A shorter man might not be able to manage it, but Kris thought he could.

Bracing his feet against one wall and his shoulders against the other, he began working his way up the rough stone wall. Once he was above the door, he turned and put his back against the wall over the door, keeping his feet and shoulders against the side walls. He was ready for anyone who came in. Die he might, but at least one priest would go down with a broken neck.

The noises in the hall were faint, but they kept up. And still no one opened his door. *What's going on?* Kris wondered again. His shoulder and leg muscles were tiring rapidly. By the time he finally heard the bar of his door being lifted, he was so cramped that he was ready to drop.

The door swung outward. There was a discordant burst of sound, as though there were many men in the hall, and a blaze of torchlight glit-tered in the room. Kris poised himself to leap.

"Kris?" a voice said. "Kris, are you in there?"

Kris said: "*Marja!*" Between the cramping of his muscles and the surprise of hearing her voice, he lost his brace against the walls, toppled outward, and collapsed in a heap at the girl's feet.

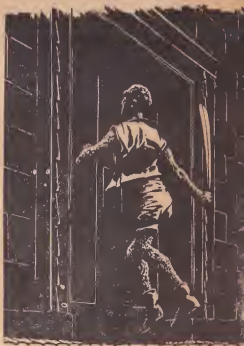
He stood up gingerly, grinning.

"I guess nothing's broken," he said, rubbing his leg. He glanced around at the group who had filed into his cell. "What's happened?"

She told him quickly. "And when we got down here, we couldn't find which cell you were in. We've released all the other men."

"Good going." He glanced at Norvis, who stood behind Marja holding a torch. "Let's get the men together and get out of here."

The news had been good—astonishing, even. So the Elder Grandfather was dead? Didn't that



prove that the Great Light was on the side of Kris peKym Yorgen? He smiled.

"Up the stairs!" he yelled. The men followed him out of the dungeon level and upward. Just as they emerged on the top of the stairs, a tremendous crash echoed through the building, followed by the savage roar of a raging mob. The doors of the Temple were down!

"Out the back way!" Kris snapped. It was a good feeling to be in command of his men again. "That mob's blind. It would just as likely kill us as anyone!" He charged down

the hall with over a hundred men at his heels. There was a priest in the hall, but at sight of them, he dropped his psych-knife and fled wildly.

There was no one firing from the roof as the men poured out the back door. Ganz peDel was at the window of the pottery shop.

"We were about to come in after you," he called. "The priests who aren't dead have deserted the roof and gone below!"

"Stand aside!" Kris called. "Open those shutters wider! We're coming through."



It took time for a hundred-odd men to get through the window, and more of Megil & peMegil's pottery went the way of all dishware, but it was no more than a few minutes before the operation was completed. Kris pulled the shutters closed and bolted them. "Up to the roof," he said. "Maybe we can see what's happening."

From the roof of the pottery shop, there was little to see at first. There were unmoving blue-and-yellow-clad figures lying scattered over the roof of the Temple, but there was no sign of life. They could see the far edge of the Square, but it was difficult to tell whether there was anyone moving in the flickering torch-light.

But the roaring screams of the frenzied mob still filled the air.

Suddenly, one of Kris' men shouted. "Look! Look at the lens!"

The great lens on the roof of the Temple was glowing with orange-red light.

"Torches," someone said.

Kris shook his head. "Torches? No! Those silly fools are *burning the Temple!*"

It was true. The glow beneath the lens became brighter, and the howl of the mob changed in pitch and character as they ran out of the building, trampling their way back over the fallen front door. Soon the Square of Holy Light was filled with fleeing people.

Kris felt the way he had felt when the School had burned—helpless. But it was worse this time. He had

not wanted to fire the Great Temple—no, not the Temple.

"The lens! The lens! Look at it!" Kris realized it was his own voice shouting.

A black fissure was moving across the huge lens, spreading rapidly, flawing its perfection. Then another and another appeared. The cooling rain dropping on it from above was competing with the hellish fire beneath.

Then, with a sudden roar, like a crack of thunder, the four-thousand-year-old lens, which had brought the beams of the Great Light into the Temple for hundreds of generations of Nidorians to worship, shattered into fragments and collapsed into the inferno of flame below.

XX

Leader Kris peKym Yorgen stopped at the gaping door of the Temple and looked in, as he had every morning for the week since the Temple's destruction. Norvis, at his side, waited patiently.

The interior of the auditorium was a blackened ruin. The costly drapes, the intricately carved pews, the fine paneling were nothing but ash which lay soggly on the floor, wet by the nightly rains that poured through the opening in the roof that once had held the lens. Now the hole gaped openly like a raw wound.

Somehow, Kris felt that he had lost a part of himself when the Temple burned. The Bel-rogas School had been nothing, actually.

A century ago, it had not even existed.

But the Temple had stood for four thousand years, rock-solid and seemingly eternal. And now it was a gutted shell.

Only the interior of the auditorium had burned; the thick stone walls of the building itself had only been blackened from holding the flames until they burned themselves out. The offices and the meeting rooms were untouched.

"You keep looking at that, Kris," Norvis said softly. "Are you thinking of cleaning it up, or rebuilding it, or—?"

Kris shook his head decisively. "No. Not yet. Not until the Council has been re-formed and we have returned to the Way of our Ancestors. Only then will we be in a position to rebuild the Temple. It was desecrated by the Earthmen, and the Great Light has cleansed it with fire. Not until we are worthy will we rededicate the Temple."

He turned and walked to the side door of the Temple which led into the offices and business rooms. The bronze doors that led into the auditorium had been discolored by the heat, but they had held back the fire. Only one of them was badly warped.

The guard at the stairway nodded as they approached. "Hoy, Ancient Leader. Hoy, Aged Secretary."

Kris nodded curtly and ascended the stair to his office. Norvis followed him up.

Grandfather Marn peFulda Braj-

yyd was already waiting for him. The priest was seated in the outer office, his fingers rubbing the small lens that hung on a silver chain around his neck. "Bless you, Leader Kris," he said, smiling.

"And you, Grandfather. What brings you here so early?"

"I've appointed a new Priest-Mayor of Vashcor," Marn peFulda said. "An excellent young man. And as the oldest living priest of the Clan Brajyyd, I've come to take my place on the Council."

"Fine!" Kris said. "Let's go inside my office and figure this thing out."

"Your Announcement of Purification was a great stroke, my son," the Grandfather said as he followed Kris into the inner office. "It saved the life of a good many priests. Perhaps even I might not be alive today if you hadn't told the people that all those who were still under the influence of the Earthmen were dead."

They entered the office. Norvis said, "I'll go to my own room, Kris. I have a great deal of work to do."

Kris nodded. "Go ahead. There's plenty to be done." After Norvis was gone, Kris waved the priest to the chair facing his desk. "Sit down, Grandfather. We've got a little figuring to do. Nidor is still in an uproar. I've put the whole world under Peace Law—my men are acting as Peacemen, with the regular Peacemen under them. But that's not the Way of our Ancestors; we must return to the Way."

The priest nodded without speaking.

"There are nine of the original Council left alive after the fire," Kris said. "With you, that makes ten. We're six short."

Marn peFulda nodded. "And with the records destroyed, we have no way of actually knowing who the oldest priests of each Clan are. It may involve a little guesswork before we've filled the Council again, and"—he paused and smiled slyly—"I don't know *how* we'll ever decide who the Elder Leader will be."

"It doesn't matter," Kris said decisively. "We'll fill the Council somehow. And—you are hereby appointed Leader of the Council yourself, until the emergency's over. You'll take rank over all present and future members. They'll obey your orders."

"Excellent," the priest agreed. "It's a drastic measure, I'll admit—but these are times that require drastic measures."

"Right. There are a few other things to take care of, too. The old Council found me guilty of sacrilege, treason, and blasphemy. Ah—that decision must be set aside, since the Great Light has shown that I was right."

"Naturally," said the priest smoothly.

"There's only one other thing. Technically speaking, I hold no position in the Government at all. I think it might be wise to see to it

that I have some sort of official standing."

The old man's eyes narrowed in thought. "There's no office I know of that . . . wait a minute!" He stood up, walked to the bookcase in the back of the office, and took down the Scripture and the Law.

He flipped the sacred volume open, riffled through the pages, and selected the passage he wanted. "Here it is," he said. "Seventh Section. 'And it happened that in the days of Dmorno the Holy, the Great Light sent a blight over the land, for the people were unrighteous. The clouds that shielded the world from His angry radiance were dissipated and became thin, and the crops were withered and great storms raged. Being without food, the people suffered greatly.'

"Now, at that time there lived a man of great wealth in Gelusar who had stored away vast quantities of peych-beans for his own subsistence, and the Council declared that he had much more than he needed, and that food from his warehouses should be dispensed to the poor and the needy. This he refused to do.

"Thereupon, the Council appointed an Executive Officer, a pious and strong man named Lordeth, who was given command of Peacemen and who went forth to the rich merchant and took from him his warehouses and distributed the food to the people.'"

The priest closed the book. "There you are. In emergencies it

is perfectly proper to appoint an Executive Officer." Then a frown passed over his face. "I hope I can get the Council to agree."

"They'll agree," Kris said cheerfully. "If they don't, they'll wish they had. We *must* return to the Way of our Ancestors!"

The priest smiled. "You'll be the first man to hold that office in three thousand years, Kris peKym. You have a great responsibility, my son."

In a nearby office, Norvis fingered a writing pen in his hand as he spoke to little Dran peDran Gormek.

"Now, do you follow me, Dran peDran? Not a word of this to anyone."

Dran fidgeted. "Not even to the captain?"

Norvis pursed his lips. "Kris does not want it known that he even suspects there still are Earthmen on Nidor. It would weaken his position, you see. If I'd selected anyone but you for the job, I'd have told them that Leader Kris doesn't even know about it. But I can trust you. Never even mention to him that you know anything about this—understand? That's the way he wants it."

Dran nodded. "I doesn't quite understand, but if the captain says so—he says so."

"Very well, then. Now look at the map." Norvis walked over to a map of Nidor hanging on the wall. "Here's Gelusar. Due East are the Mountains of the Morning. Here"—he made a tiny cross with

his pen—"is the Earthmen's base. You'll go by deest to the foothills of the Mountains of the Morning, and then climb on foot the rest of the way. Now, mind you: all you're to do is look over the base. You're not to expose yourself in any way. Keep out of sight and you'll be safe."

"I'll do, sir."

"I want to know how many Earthmen there are, and whether it would be possible for us to get at them if we moved carefully. Perhaps they won't even be there; they may have deserted the base. But make sure, and don't go into the base itself, even if it looks deserted. Understand?"

"I understands," Dran said. "I goes immediately?"

"Immediately," Norvis said.

The small Bronze Islander left without further word. Norvis waited for him to close the door, then leaned forward and clasped his hands on his desk, looking abstractedly at the inlaid pattern in the wood.

The threads were beginning to come together now. Kris had proven to be three times the leader Del ever was—and the School lay in ruins, the Temple was a husk, Kiv was dead, and the power of the Council broken. Nidor's downward slide had been checked—maybe.

The whole thing hinged on whether the Earthmen were actually gone or not. Norvis' mother, Sindi iRahn peKiv Brajjyd, had told him about the base when he was young.

His father, Rahn peDorvis, had run away from the Bel-rogas School for some reason—Sindi had never said why—and Sindi had followed him. Rahn, taking a shortcut across the mountains on his way to Vashcor, had stumbled on the Earthmen's lair, and Sindi behind him. Rahn had been caught, and by some mysterious magic had had all memory of his visit removed. Sindi, unobserved, had seen all.

Norvis knew his mother had told the truth; the base was out there. It presented a potential threat to Nidor as long as it remained. How could they proceed with the job of rebuilding, if the Earthmen might be still on the planet?

Norvis needed information. Dran, a trained seaman, was observant. He should be able to bring back plenty of information. *And it's information we need*, Norvis thought grimly. *We don't know nearly enough about the Earthmen—yet!*

XXI

Kris peKym looked out his window over Holy Gelusar and frowned. He had driven the Earthmen from Nidor; he had purified the Council. But the emergency was not yet over; he had much yet to do.

His attention was distracted by a motion at the corner of his eye. It was someone mounted on a magnificent blue-gray deest, trotting across the Square of Holy Light.

He smiled as he recognized Marja geDel. She deserved a magnificent

deest; she was a magnificent woman. The rifle-armed guards around the Square nodded deferentially as she passed, giving honor to the betrothed of the Leader. Kris smiled. He had not asked her yet, but there was no question about it.

Or was there? Come to think of it, he'd better make sure. His position on Nidor would be just that much more secure if he were a family man.

The girl cantered her animal across the Square, dismounted before the Temple, and tethered her deest. She hadn't looked up. It would have been undignified for her to wave at him, or for him to call to her. She entered the door below, disappearing from Kris' sight.

He returned to his desk and sat down. Within less than a minute, there was a rap at the door.

"Come in, Marja."

She opened the door, smiling radiantly, and closed it again behind her. "Do you have any more work for me this morning?"

"Yes, as a matter of fact, I do. Sit down a minute."

She frowned in puzzlement at his brusque manner. Kris ignored the expression, pulled a piece of paper toward him, and began writing.

"Kris—"

"Wait till I've finished, Marja."

He wrote deliberately, clamping his lips. When he was through, he lifted his eye and handed her the paper. "Take this list into the market center first. Have the stuff delivered if you can't carry it. That last

item you'll have to look for—but don't take anything less than the best."

She read through the list. "All kinds of clothing—and furniture—and . . . and a *house*!" She looked up. "Kris, what *is* this?"

He rested his chin in his palm and grinned at her. "If you're going to be Marja iKris, you'll have to have the best of everything, won't you?"

"Oh, Kris! When?"

"Three days is the proper time after announcement, isn't it? I'll announce it today."

"Fine," she said happily. "You'll have to ask Norvis peKrin first, though."

"Norvis? Why Norvis?"

"Didn't you know? Father signed guardianship of Ganz and me over to Norvis in case of his death—he did it several years ago."

"No, I didn't know that," Kris said. "But do you *need* a guardian? You're old enough to know what you're doing, you and your brother."

"Nevertheless, you'll ask Norvis. This has to be done properly."

"Anything you say. You'll have both him and Ganz as escorts, then?"

She smiled. "I think that would be the best. While you're talking to Norvis, I'll see to this list. But I'll need money."

"Don't worry about that," Kris said expansively. "Since the cobalt's back in the Bank, all that Dimay scrip I bought up at half price is worth face value again. Just tell the

merchants to collect from Norvis, that's all."

She leaned over the desk and kissed him before she left.

It was more than the customary three days before the marriage could take place. On the scheduled wedding day, four more priests turned up with claims for the Elderhood, and each of them had to be considered in turn by the Council. Annoyed, Kris postponed the wedding two days and presided over a hearing, Marn peFulda at his side.

Two of the priests turned out to be of the Clan Shavill, and the younger of the two had to be sent back to his village with regrets. That left three vacancies in the Council: the clans Nitha, Sesom, and Gormek. Rumor had it that a Grandfather Gasus peNils Gormek was going to sail soon from the Bronze Islands, but so far there was no sign of him.

Also, by a solid vote of acclamation, the thirteen Elders decided to appoint Merchants' Party Leader Kris peKym Yorgen as Executive Officer of Nidor, the investiture to take place on the day of the Feast of the Sixteen Clans, which fell a day after his revised wedding date.

The wedding itself was a simple affair, held in the little Temple of Kivar on the southern side of the city. The Elder Grandfather Marn peFulda Brajjyd officiated.

The little temple held only a few people. The Council Elders attended, and a few personal friends, but the

streets were blocked off by Peacemen to prevent the curious gawkers from interfering.

Norvis and Ganz stood on either side of Marja, who was dressed in the traditional purple cloak of maidenhood. Behind them was the altar, before them the open door of the temple. Kris stood in the doorway, resplendent in the black-and-red uniform of the Hundred Men.

Off to one side, Grandfather Marn gave a signal, and Kris strode toward the altar. Four paces before the trio, he stopped and said: "Norvis peKrin Dmorno, Ganz peDel Vyless, I greet you. I come to declare my love for the woman you have sworn to protect."

"Will you swear to protect her as we have?" Norvis asked.

Kris' answer was a long and involved oath, which he couldn't remember and had to read from the Book of Liturgy. When it was over, Norvis said, "If she will accept your oath, we will relinquish claim."

"I accept him," Marja said.

"Then we charge you, Kris pe-Kym, to take her and feed her and clothe her and protect her. She is yours."

Marja stepped forward, and, as she did, Grandfather Marn raised his hand. "Hold! I ask both of you—have you asked the Great Light's blessing on this union?"

"We ask your blessing now, O Ancient Grandfather," Kris said. "And we ask that you pray for us."

Grandfather Marn gave his blessing and the ceremony was over.

It was over, and Norvis, for one, was glad of it. He watched Kris ride off on a deest with Marja in the saddle in front of him, while the Hundred Men led them on a triumphal parade to their new home.

Norvis felt a warm glow of accomplishment as he watched them round the corner and head northward. Kris had done his job and done it well; he deserved what he was getting—wealth beyond any ordinary person's dreams, and one of the most beautiful girls on the face of Nidor.

Quite a triumph, Norvis thought, *for one who would have been a simple peasant's son had all gone well with Nidor.*

Norvis shrugged and mounted his own deest. He had other work to do. He, too, trotted northward, but by a different route; he had no desire to take part in the parade. As he wended his way through the streets, no one seemed to pay any attention to him. He was a nonentity, a nobody, merely the Party Secretary. Which was just the way he liked it.

He was only a few blocks from the Temple when he saw a familiar figure turn onto the avenue from a side street just ahead.

"Dran!" he called. "Dran peDran Gormek!" He urged his mount to a faster pace.

Dran reined in and turned his head. "Hoy! Secretary!"

Norvis pulled up beside him. "How was the trip?"

"I is dirty and tired," Dran said.

There was a grin on his owlish face. "Climbing mountains is hard work." As they trotted on down the street, side by side, he added, "I is got good news for you, though. I find—"

"Not yet," Norvis interrupted. "This is too public. You can tell me what you know about *them* at the office."

"But that's just it," Dran said, still grinning. "We isn't got anything to worry about! They isn't there!"

Norvis jerked his head around. "What? What's that?"

"They isn't there," Dran repeated. "I find the place you mention—a wide, flat area. But there isn't anything there. No buildings, no magic machines, no nothing."

"I see," Norvis said slowly. "Yes, I see."

"That means the captain really is driven them off Nidor! We is free—really free!"

Norvis nodded abstractedly. When they pulled up in front of the Temple, he said, "Since you found nothing, Dran, there's no need to tell anyone of my foolish suspicions, is there? We'll just forget it."

"Sure, Secretary," Dran agreed. "You is done the right thing. You has to know the truth. Now we knows."

"That's right, Dran. I'll see that you get a bonus for this—and you can do a little celebrating."

"Hoyboy! Thanks to you, Secretary Norvis!"

An hour later, Norvis was saddling his deest and slinging two saddlebags of supplies over the animal. He had told Kris that he was going to Tammulcor on business, to check on the Bank of Dimay, which was still in the throes of reorganization.

But he had no intention of heading south; he was going east, to the Mountains of the Morning. Dran peDran had seen nothing—but that meant nothing. Norvis recalled his mother's telling him how the Earthmen had taken a part of his father's memory. Rahn peDorvis had never remembered anything about that trip to the mountains.

If the Earthmen could take a memory away, couldn't they replace it with a false one?

Maybe there was nothing up there; maybe there never had been. But Norvis realized he could never take another's word for that. Dangerous jobs could be delegated, sure—and, Norvis thought, it was best for all that dangerous jobs be done by someone else. But there were times when a job could only be done by one person—and in this case, that person was Norvis peRahn Brayjyd.

He pushed a pair of pistols into his belt and lifted himself into the saddle. Twenty minutes later, he was trotting across the Bridge of Gon, heading eastward across the Tammul into Thyvash towards the Mountains of the Morn.

XXII

The day of the Feast of the Six-



teen Clans brought a brisk wind from the east, heavy-laden with dampness.

Kris looked out the window of his office, watching the lower wisps of the eternal cloud blanket scud-ding across the sky.

"I hope we're not in for a storm," he said. "This would be a poor time for the Great Light to send His Flashing Emissaries across the sky." He smiled grimly. "The noise they make might drown out my speech."

Elder Grandfather Marn peFulda chuckled. "The investiture takes place immediately after the midday services, and the sky ought to be quiet by then. Don't worry about it."

Kris turned from the window and settled himself in his chair. "You know, Grandfather, it's a peculiar

feeling to realize that more than four thousand sacrifices have been made to the Great Light on the Feast of the Sixteen Clans at the Great Temple—and this year there will be none."

"I know," the priest agreed. "It is His will."

Kris stared at the surface of his desk for a long moment, and then pulled himself out of his introspective mood with some effort. "You'll be the celebrant at the services, of course?"

The Elder Grandfather nodded. "We'll start at the Temple of Kivar, just as we did with your wedding—but this will be an official ceremony, and, if I may say so, much more imposing. The actual investiture will take place on the balcony of the Great Temple, as you asked."

Kris nodded. "Good. You—"

There was a rap at the door. "It's Ganz peDel, Leader," came the voice.

"Come in, Ganz," Kris called out. He was getting to like the boy; except for the hatred for the priesthood that his father had instilled in him, young Ganz might eventually have made a good Party Leader. Perhaps, even yet—

The boy walked in. There's a priest to see you, Leader." There was no distaste in his voice; he had learned to conceal it well. Or perhaps he was actually changing his mind about the priesthood.

"Who is it?" Kris asked.

"A Grandfather Gasus peNils Gormek, of the Bronze Islands."

Elder Grandfather Marn peFulda stood up. "The Gormek Elder! Excellent! Send him in, my son."

Ganz stepped back, closing the door.

Grandfather Marn turned to Kris. "This makes fourteen! The Elder Council will soon be complete, my son. I hope he's as good a man as his predecessor, Elder Vesol peSkel Gormek; in spite of the fact that he was . . . ah . . . under the influence of Darkness, he was a wise old man."

Kris shrugged. "Darkness take Vesol peSkel; let's see what this Bronze Islander is like."

The door opened, and a blue-robed priest stepped in. His face was like a piece of wrinkled leather, covered with sparse silvery fuzz. He

peered around the room with bright, clear eyes, seeming to take in everything at a glance.

He nodded his head at the Elder Grandfather. "Elder, I asks your blessing. I is Grandfather Gasus peNils Gormek."

Marn peFulda gave his blessing. Then: "May I ask the date of your birth, Grandfather?"

The priest smiled. "On the ninth day after the Feast of the Great Lawyer, in the Year of Dmorno, of the 320th Cycle."

Kris sat up in his seat. The old Gormek was older than Marn peFulda—and theoretically deserved to be Leader!

But the old priest raised his hand. "You doesn't need to worry, Elder Grandfather; I is heard about Leader Kris peKym's order. You is the Elder Leader, and I does not wish to make any claims. I is an old man; I knows nothing about governing a world. I is been isolated on my Islands for more than seventy years. I has no political ambitions, but when I is called, I comes." He turned to Kris. "I gives you my blessing, Leader Kris. You is been needed on Nidor."

Elder Grandfather Marn peFulda relaxed visibly. "I welcome you, Elder Grandfather Gasus peNils Gormek. Will you be ready to take part in the investiture of our Executive Officer after the midday services?"

"I is happy to," the Elder Gormek said.

Marn peFulda looked back at Kris and said, "The Council is about to

meet. I'll be with you at the services."

Kris nodded. "Good. I'll see you then."

Kris peKym Yorgen, Executive Officer of Nidor, stood upon the balcony of the Great Temple and faced the throngs of people in the Square of Holy Light.

The investiture ceremony was over; a long triumphal procession through the streets had preceded it, with the people cheering on every side. And all the way up from the smaller temple, Kris' name had been shouted.

The procession itself had been colorful. Half of the Hundred men were in the lead, their red-and-black uniforms worn proudly; the other half brought up the rear. Between them, mounted on brightly caparisoned deests, had come the new Council of Elders, with their blue-and-gold robes and their bronze coronets gleaming in the filtered light. And then, surrounded by yellow-robed acolytes, had come Kris peKym Yorgen, the Great Exorciser and Executive Officer of Nidor.

The wind had added its own touch, whipping the robes around, making them flutter brightly beneath the effulgence of the Great Light.

All this was a bright memory in Kris' mind as he stood on the balcony of the gutted Great Temple and looked at the cheering throng below. Out of the corner of his eye, he saw Elder Grandfather Marn

peFulda Brajjyd stand and raise his crossed arms in a general blessing. The crowd became quiet.

The Grandfather looked at the sky. "O Holy Light, we have, this midday, offered our sacrifice in Your name, and now, we ask Your blessing on Your people and on Your Priesthood.

"Led by those who had fallen under the influence of the accursed Earthmen, we have erred in Your sight. But now we have been illumined by Your light, and we seek to repair the damage that has been done and atone for the injury we have done You. We pray for Your blessing upon us."

He lowered his arms and looked out over the Square of Holy Light. "We, the Elders of Nidor, in Council assembled, have come this day to invest in a great man the powers of a special Office. All of you know what has happened—"

The Grandfather continued his introduction for several minutes, but Kris' attention drifted away. He thought of what he was going to tell the people. What he said today would not only be spread all over Nidor, but would ring through history for all eternity. It had to be just right. It had to be perfect.

So intent was he on his own thoughts that he barely noticed when the Elder Leader put the bronze chain around his neck—the chain carrying a specially struck medal signifying his office. He scarcely noticed as the other Elders gave him their blessing. Only when

the Elder Leader said, ". . . and now your Executive Officer will speak; I charge you to pay strict attention to what he has to say," did Kris return fully to his surroundings.

He stepped forward to the rail of the balcony and raised his hand to still the shouting and applause.

When the crowd finally grew quiet, he said, "Bless you for your righteousness, my friends. The Great Light has granted us His illumination, and the—"

He got no further. He saw what had happened only a fraction of a second before he felt it.

Across the Square, from a window of one of the buildings, had come a puff of smoke, which the wind had quickly whipped away. Then had come the sound of a loud cough.

And then had come a painless shock, as though someone had hit him hard in the chest with a pillow. Kris fell back, more with surprise than anything else, looking down at the tattered hole in his vest and the blood that seeped out of it.

There was confusion all around him, but still he didn't pay any attention. Someone grasped him by the shoulders and eased him to the floor of the balcony. Someone shouted for a surgeon and a physician. From somewhere came the crack of rifles. But to all these, Kris paid no attention.

He put his hand up to his chest, and someone pulled it away.

"Is he dead?" asked a voice behind him.

"No," said another. "He's badly

hurt, but it didn't strike his heart."

"We must get a doctor—quickly!" said a third.

And then sight and sound and feeling dissolved into the darkening blur of unconsciousness.

XXIII

Norvis peRahn Brajjyd wanted to snarl and curse, but he hardly dared breathe. The wind-whipped night rain had made his body-hair cling soggly to his body, his clothes were dripping with water, and the rocks were so slippery that it seemed almost impossible to climb them—especially with the wind sweeping down the mountains, tugging at his clothing and splashing rain in his eyes.

Still he pushed on; he didn't want to be caught on the mountain when firstlight came. He had waited at the foot of the towering pile of bare rock until nightfall. His mother had climbed it successfully at night, and that was the way he was going to do it.

He knew he was in the right place; it was the only place that looked as though it might be a gap in the mountains through which one could reach Vashcor.

At last he reached the top, and was overjoyed to see the oddly-shaped rock his mother had described to him. Now he knew beyond doubt that he was in the right place.

He edged his way up to the rock and peeped over.

And a vast disappointment washed over him, hardly diluted at all by the faint sense of relief he felt.

There was nothing there at all. There was nothing but the broad, flat area that Dran peDran had described. The dim glow of the Lesser Light didn't show much detail, but it was obvious that there *had* been buildings of some kind here once—the flat plain itself was artificially leveled.

But it was empty. Nothing moved on it, nothing but the little rivulets of water that skittered across its surface ahead of the driving wind.

The Earthmen were really gone, then. Somehow, it didn't seem right. There seemed to be something left unexplained.

"Welcome, Norvis peRahn Braj-
jyd," said a soft baritone behind him. "I thought you'd never get here."

Norvis turned slowly. The only surprise he felt was in the fact that he was not surprised at all. He knew who it was, and it seemed right somehow.

"Hoy, Smith," he said. He drew his gun and aimed it at the Earthman's midsection. "Wet out, isn't it?"

Smith, standing tall and solid a few feet away, pretended not to notice the gun. "Wet? Yes; I've always hated Nidorian weather. But then, I doubt if you'd like Earth. Direct light from the sun wouldn't be too good for your skin."

Norvis looked at the man he had

hated for so long, and felt an almost overwhelming desire to press the trigger. But he stayed his hand. He needed information first.

"What *are* you, Smith?" It was a short, hard question.

"You tell me," the Earthmen replied.

"You're mortal, I'm sure of that. You may have long life, but if I shot you, you'd die like anyone else."

The Earthman smiled a little. "Right. And where do we come from? The Outer Darkness?"

"Something like it," said Norvis. "Without the mystical rot. My guess is this: according to Scripture, a cataclysm thousands of years ago all but wiped out life here. If you read between the mysticism, you'll see that what happened was that most of the great continents sank beneath the sea. Only sixteen families survived to come to Nidor, led by Belrogas Yorgen. But I think there are other continents out there in the sea, and I think you Earthmen come from one of them. None of our ships has ever sailed out far enough to find it; they couldn't carry enough food or water. But with the machines you have, you could come to Nidor. Originally, we must have come from the same stock—but men, like animals, can change over the years and diverge from each other. So, in a way, you *are* from the Outer Darkness."

Smith chuckled. "Very clever. Wrong, of course, but very well thought out. I tell you in all truth that we are both from the Outer

Darkness and from the place where the Great Light is."

Norvis shrugged. "You're being ridiculously cryptic, but—no matter. What I wanted to ask was—*why*? Why did you have me thrown out of school? Why did you lie? Why did you wreck my life and the life of Nidor?"

"Why? To save your life, Norvis. Remember what happened to Dran peNiblo Sesom?"

Norvis nodded slowly. Dran peNiblo, the sniveling blockhead who had received the credit for discovering the growth hormone Norvis had worked so long and hard to find—Dran peNiblo had been mobbed and hanged because his discovery had caused the Great Depression.

"If you had taken credit for your work," the Earthman went on inexorably, "you would have died as surely as he did. Didn't you ever wonder why such a stupid, mean little creature was ever allowed to enroll at Bel-rogas?"

Norvis blinked. "You let him in just to use him as a scapegoat?"

"Why else? He was expendable—you weren't. And did we really ruin your life? You've been wealthier, happier, and more powerful this way than if you'd been hailed as the discoverer of the Growth Hormone."

"So poor Dran peNiblo was framed for death. You're a pack of ruthless scoundrels, Smith!" His finger tightened on the trigger, but he didn't quite press it—yet.

"So now it's 'poor Dran,' is it?" Smith asked sardonically. "And

we're ruthless scoundrels? You're thinking isn't very clear tonight, Norvis peRahn. Are we more ruthless than you? Who was it who murdered the man who had befriended him and given him a good job when he was a youth without a weight to his name? *Who was it who shot down Del peFenn Vyless in cold blood?*"

Norvis' gun hand shook. How had the Earthman known that? How did they know so much? How—? He clamped down on his whirling thoughts.

"I did it for the good of Nidor," he said harshly. "Do you think I *liked* doing it? If Del had gone on with his tirades against the priests, the Merchants' Party would have collapsed in a year. He would never have stepped down peacefully and let Kris peKym take over. I had to do it—don't you see?" His voice became almost pleading at the end.

Smith answered softly, "We *do* see, Norvis. But we want you to see, too. Now do you know how we felt when they hanged an innocent boy? *Now* do you know how we felt when the students and priests of Bel-rogas were butchered by a howling mob? We could have stopped it. We knew the cobalt was buried there. Do you think Kris could have carried off such a stupid trick if we hadn't helped him?" Smith smiled. "We knew what would happen, and we didn't lift a finger to stop it—because it was for the good of Nidor."

For the first time, Norvis thought he saw a glimmer of light. "How?" he said. "Why?"

"Why? Now that you've lowered that pistol, I'll tell you."

Norvis looked at his gun hand. The pistol was pointed at the wet rock at his feet. He brought it up again—and stuck it in his belt.

"All right," he said. "Let's hear it."

Smith's bearded face broke into a grin. "Not here; you must be soaking wet."

"It's nothing. I—" And then, for the first time, he saw that Smith, standing there in the driving rain, was comfortably dry. The raindrops, now that he looked closer, seemed to be going *around* the Earthman somehow.

He suddenly felt very foolish. "The bullet would have done the same thing," he said aloud.

Smith nodded. "I'm afraid so. I didn't think you'd shoot, but I value my life very much." He reached inside the pearl-gray shirt and took out a small, flat box which had a belt attached to it. "Put this on," he said, handing it to Norvis. "It's a remote-control job, connected to my own; I'm afraid you couldn't handle the controls without practice."

Numbly, Norvis strapped on the little force-field generator. Smith did something with the box at his own waist, and Norvis felt himself suddenly surrounded by a warm *thickening* of the air around him.

"We're going up," said the Earthman. "Don't panic."

"I won't," Norvis said. Suddenly the ground dropped away from beneath him. He had no sense of motion; it was as though Nidor itself were falling away. He gasped. It was more frightening than anything he had ever felt.

"Relax," Smith said. "Don't look down. Look at me."

Norvis forced his head up. There was Smith, just standing there—with nothing below him. It was as though they were still on the ground.

"It's a little surprising the first time," Smith said. "But you get used to it."

"But—" There was something missing, and Norvis couldn't place it at first. Then it hit him. "Where's . . . where's the blue glow?" he asked.

"This?" Smith touched his belt, and the familiar blue aura surrounded him for a few seconds. Then it blinked off.

"I see," Norvis said. "It isn't a necessary part of the machine's effect; it was just to impress us."

"Partly," agreed Smith, "but it was more to mislead you. If you Nidorians had thought we could float around in the air unseen, you'd have been constantly on the lookout for us at night. But as long as you expected a blue glow, we could do our snooping unsuspected and undetected."

A sudden fog enveloped them, and Norvis felt as though he were

hanging suspended in nothingness. "Where are we going, Smith?" His voice sounded strangled and helpless.

"Hold on, Norvis. We're going through the cloud layer."

Suddenly, above him, Norvis saw a glow of light. It seemed to be moving toward him, brightening as it came.

"And what's *that*, Smith?"

"Just the open door of a spaceship," the Earthman said. "The men inside are guiding us toward it now."

They were floating just outside it. It was an open door in a wall of metal—hanging in the sky. Norvis' brain felt as though it were spinning dizzily with fear.

And then he and Smith were floating inside. The door closed behind them, and abruptly everything was all right again. He was standing in an ordinary room—well, all that metal and the queer things around the walls were strange, but it was a room—just a room. Not the terrifying nothingness he had just experienced. He stamped on the floor, enjoying the solid feel of the plastic-covered metal floor beneath his feet.

"Don't rock the boat, Norvis peRahn," said one of the Earthmen, laughing pleasantly.

Norvis looked at the two other Earthmen in the room. "Boat?" he said blankly. "Is this a boat?"

"Something like it," said Smith. "Norvis peRahn, I'd like you to meet my friends, Harrison and Davis."

Norvis nodded mutely. The Earthman Davis looked very much like Smith; Harrison's skin was darker, and he was beardless.

Then he noticed that the Earthmen were looking at him closely. "What's . . . the . . . matter?"

Davis and Harrison grinned. "Sorry," Davis said. "We've just never seen a Nidorian in the flesh before. You're a very handsome people."

"They're the crew of this small ship," Smith explained. "They've never seen the populated parts of Nidor, only the spacefield."

Norvis let out his breath. "Can I sit down?"

"Sure," Harrison said. He touched something on the wall, and a small, cunningly-concealed seat slid out. Norvis sat down gratefully. "You call this a ship," he said. "The idea of a ship that sails through the sky is fantastic!"

"Think so? How would you like to see the Great Light?"

In spite of himself, Norvis felt a tingle of shock.

"Before we do," Smith went on, "I'll explain what the Great Light is. It's simply a huge ball of incandescent gas."

"It?" Norvis had never heard the Great Light referred to with a neuter pronoun.

"It's a great ball of gas," Smith continued. "So big that your mind may have trouble grasping it, and so distant from Nidor that it's unbelievable. If there were a road leading from Nidor to the Great

Light, and you had a fast deest that would never tire, and you rode at top speed, day and night—it would take you more than a thousand years to reach it!”

Norvis said nothing. He couldn't.

“Take her up, Davis,” Smith said. “We'll show him what we're talking about.”

A few moments passed, as Norvis sat dazedly. Then Smith said, “Norvis, come here.” He walked over to where the three Earthmen were standing in front of a large pane of black glass. Behind the glass were thousands of tiny sparks of light.

“You see,” Smith said, “but you don't understand. We said we came from the Outer Darkness, remember? That's it. And those little lights, Norvis, are thousands upon thousands of Great Lights, so far away that it's impossible for me to tell you how far—your language doesn't cover it!”

Norvis dizzily tried to grasp the immensity of the great black abyss he was staring into. Then, out of the corner of the window, there came a line of light, a great curve of glowing radiance. Below it was utter blackness.

“We're taking you out where you can see Nidor; that's your Great Light, shining through the clouds on the other side of your world. We're on the night side now, but we're heading for the day side. We'll have to put filters on the viewport; the Great Light is so bright it would blind you in a few seconds if you looked directly at it.”

They showed him the Great Light, and they showed him the huge white ball that was the cloud-covered Nidor. They explained it all, carefully. He learned that his theory about the Cataclysm was correct; Nidor was a planet of shallow seas and low mountains, and after the tremendous earthquake of thousands of years before, only one little continent had remained—the continent Norvis' people had called Nidor, and which they had thought was the whole universe.

When it was all over, he was sitting again on the little seat, facing the three Earthmen. “It's terrible,” he said softly. “We have thought that the Great Light was something that helped us and protected us, but—”

“Just a minute,” Davis said. “Don't get the idea we're trying to tell you that there *isn't* Someone who keeps an eye on us all. We, too, have a concept of a Great Being—but if He exists, that ball of gas out there is just part of His handiwork; if He exists He's a lot bigger and grander and more powerful than that star. And, if He exists, your prayers have reached Him, no matter what you call Him.”

Norvis nodded, but he knew his faith in the priesthood of the Great Light, small though it had been before, was now completely shattered. He frowned. “What was your reason for doing all this, Smith?”

The Earthman knotted his fingers together. “Let's look at it this way,”



he said, after a long pause. "A man needs friends. He can't live alone. He must have someone to like and love, and someone or something he can pit himself against. Call it conflict, call it challenge, if you like. Not the bloody conflict of battle, but the friendly conflict of a game. Do you follow?"

Norvis nodded hesitantly.

"Well, we Earthmen need friends, too. It's the same thing with a race. Long ago, we were divided into different groups—not true races, for they could interbreed, but differing in skin color and other minor ways. These groups conflicted with one another—sometimes violently—and this conflict helped to make us wiser and stronger because, in watching others we learn more about ourselves.

"We fought and quarreled and argued. We were divided by religions and political beliefs and by skin color, and the battles surged over Earth for many thousands of years. And all the time, we were learning. We developed weapons so powerful we dared not use them; we conquered space and the battles still went on. But eventually, the inevitable happened.

"The lines of demarcation between the groups began to blur. Political divisions became meaningless, religious differences were smoothed out, and the various races blended into one. We became a unit. A single, solidified group—the Earthmen. We had conquered our planet and the stars. And ourselves.

"But we lacked something," Smith continued. "We lacked friends. And we lacked conflict. Within a few thousand years, we would stagnate and become static and—eventually—die out. And then we found Nidor. We had searched for another intelligent race for centuries before we found you. Once, we found an intelligent race—vicious, monstrous things whose thinking was so different from ours that we had no common meeting ground. We were forced to destroy them.

"But Nidor was perfect—an intelligent species, not too unlike us, with a way of thinking only slightly different. And there was no question of our ever losing our separate identities as races; Earthman and Nidorians are too unlike for that. But we had found what we needed. We needed you—and you needed us. You had formed a perfectly static society; it was incredible to us that a society could remain unchanging for so long. So we had to get you to move, to start a dynamic instead of a static civilization."

Smith moistened dry lips. "*We have done that now,*" he said.

"I still don't understand," Norvis said weakly. "You've wrecked us—ruined us. Things will never be the same again. Why didn't you just come down and teach us about your race and your world, instead of all this mummary?"

"It wouldn't have worked. Unless your people developed on their own, they would have been so overwhelm-

ed by us that we could never be equals. So we had to smash your culture—force you to learn to build anew.”

“But—to smash us so completely!”

Smith smiled. “We were very gentle, believe me. We could have hit you so hard you’d never have recovered—at least not in time to be of any use to us. What would happen, Norvis, if we’d dumped a few hundred billion weights of cobalt all over Nidor? Or printed up perfect imitations of paper scrip? Or blighted the psych-beans for a century? What would have happened? And there are even worse ways. No. We had to be very careful and handle you gently.”

“I . . . it’s incredible, Smith.”

The Earthman smiled. “The first thing we needed was a better, cleverer kind of Nidorian—one who could think for himself. So we started the Bel-rogas School. We taught you, and well—but the main purpose was something else.

“Our admission requirements were high. Only very intelligent and very healthy students were admitted. And the School was surrounded by spacious parks filled with romantically secluded nooks. Do you follow me?”

Norvis’ face broke into an awed smile. “Great Light! My mother and father met there—and my grandparents! You brought the best of Nidor there to . . . to *breed* them!”

Smith smiled. “That’s a rather crude term for it, but it is selective breeding. Nobody’s free will was

interfered with—no one was forced into anything. It was simply made very convenient. And we got the result we wanted, Norvis. *You!*”

“Me? I am—”

“You’re the result of four generations of carefully-controlled genetic manipulation. There are others, of course, but your line was the best. And believe me, you far exceeded our expectations. Tell me—why aren’t *you* the Executive Officer of Nidor, instead of Kris peKym?”

“I didn’t want it,” Norvis said. “I found out years ago that heroes don’t live very long. I tried it and damned near got stoned to death for my pains. Since then, I’ve left the heroics up to hero-types—like Del and Kris.”

“And Ganz peDel,” Smith added.

Norvis nodded. “I’ll probably need Ganz too before long; if Kris peKym keeps up the way he has been, someone’s going to slit his throat one of these days. But what’s this got to do with your program?”

“Simply that it succeeded better than we expected. Actually, we’d pictured *you* as the hero. We figured you’d get killed, of course, but not before you’d done your work. As it is, you’ll live to a ripe old age, pulling the strings behind the scenes. And it won’t be necessary for us to train *your* successor.”

“I feel as though *you’re* pulling *my* strings,” Norvis said.

“In a way, perhaps—but no more than we were manipulating the rest of Nidor. You happened to be an important man, that’s all.

"In your grandfather Kiv's time, *he* was important. He was studying the hugl, so we bred a new kind of hugl and started the Great Plague—which he stopped, and, in doing so, made the first big crack in your static culture. Your mother was a Brajjyd, and she married a Brajjyd—another crack in a culture that had forbidden in-clan marriage.

"And you? You found the growth hormone—all by yourself. We knew what would happen, so we pulled you out of a nasty jam and at the same time gave you a good motive for hating us."

"And driving you off the planet," Norvis said.

"Which you did admirably. We haven't done a thing since you appeared—except toss our best students out on their ears and make them hate the School, just as we did you. You've got a lot of smart lads there, Norvis. Make use of them."

Norvis nodded, grinning. "I think I'll build another school—with lots of nice, romantic parks."

Smith laughed. "Good! But remember—we haven't controlled you for years—not since we tossed you out. We actually have never really controlled you. Even when you were in School, I let you go ahead on your own. Your discovery of the hormone was, as I said, completely your own.

"No—of all people on Nidor, you alone have been completely free to do and think and act as you liked—to do the things that you thought were right for Nidor. We watched,

yes—but we have neither helped nor hindered. We simply kept silent and made our preparations to leave Nidor.

"Nidor today is your product, and its future is up to you. For we are leaving—completely."

Norvis chuckled softly. "Funny. I've dedicated fifteen years of my life to driving you Earthmen away, and now that I've done it, I don't want you to go." He looked up into the Earthman's eyes. "I see what you mean. A race needs friends. I *like* you, Smith. And my children's children will like yours."

"I hope so," Smith said. "Now, we must go—and you and I will never see each other again. It's all yours, the whole mess. You've got a broken culture to put together again. You've got at least two heretical religions springing up—the New Lawyer in Lebron, and the group in Sugon. You'll have political factions; you'll have a complete breakup of the Clan system soon. You'll have more riots, more battles, more bloodshed. But keep moving forward. In the end, you'll have something better than the dead Way of your Ancestors."

"Aren't you ever coming back?"

"Not in your lifetime—or mine. Oh, we'll peek in once in a while to check your progress, but we won't touch. This new civilization has to be a Nidorian one—not just a copy of our own. Eventually, you'll build ships like this, and we can meet on even terms—as friends."

"But Nidorians will hate Earthmen for a long time."

"Don't worry about that. We don't really call ourselves by the Nidorian word '*Earthmen*'—our own term means the same, but it sounds completely different. And these beards were grown for a purpose. Nidorians will remember the beards long after they've forgotten everything else. And we don't normally wear beards. No, your people won't know us when they first meet us, and when we finally tell them we'll both have a big laugh on the joke we pulled on their ancestors. We—"

Harrison stood up and glanced at a little machine on his wrist. "Five minutes to rendezvous with the mother ship, Smith. You about through?"

"I think so. Any more questions, Norvis?"

"I don't think so," he said firmly. "I think I understand. I'm ready to go back."

"Good. The rest is up to you. I'm going to send you back down alone—think you can take it?"

Norvis nodded. "I've seen so much now that a little drop of a few miles won't hurt me."

"Fine," Smith said. A humorous twinkle came into his eyes. "By the way, don't think you're going to get away with the force-field generator. When you get down, take it off and throw it away. We're going to destroy it, and you don't want to be anywhere near it when we do."

Norvis grinned. "I won't be."

He wasn't. When his feet touched the ground only a few feet from where he had tethered his deest, he felt the force-field die. Quickly, he unstrapped the generator from his waist and hurled it away into the rocks.

Then he mounted the animal and rode westward, not even looking backward when a silent burst of light illuminated the landscape around him. The Earthmen were gone.

He rode slowly, his mind still dazed. He had gone to the Mountains of the Morning to find out the secret of the Earthmen—and he had found. The magnitude of the Earthmen's plan dazzled him. He rode on, revolving the concept in his mind.

Nidor was a mess, as Smith had said. But it could soon be straightened out; it—

And then, quite suddenly, as though the Great Light Himself had given full illumination to his mind, Norvis peRahn Brajyd realized the enormity of the terrible thing he had done.

He had done.

He.

The Earthmen hadn't ruined Nidor—no, not at all. Everything they had done had healed itself. The hugl plague had done nothing really drastic to Nidor; in a hundred or two hundred years, it would have been forgotten. The discovery of the growth hormone had done nothing in the long run; it, too, would have

vanished away in the mists of the monotonous history of Nidor.

Who had started the Merchants' Party, and thus conceived for the people of Nidor the idea that there could be more than one group contending for supremacy? Who?

Norvis peRahn Brajjyd.

Who had begun, secretly, the little splinter groups of religion that now threatened the whole Nidorian culture?

Who?

Norvis peRahn Brajjyd.

Who had engineered the rebellion against the Earthmen? Who had actually caused the burning of the School? Who had started the agitation of the crazed masses who had burned and destroyed the Great Temple? Who had instituted the idea that Nidorians should be led by a single popular strong man instead of a senile Council of Elders?

Who had ruined, beyond any hope of redemption, the culture, the mores, the ideals of Nidor?

Who?

Norvis peRahn Brajjyd!

There was bitterness in his mouth and in his mind as he realized the full truth of what the Earthman had told him.

The process was irreversible; Nidor could never go back to the Way of the Ancestors. That Way implied a certain innocence—an ignorance of other ways. But Norvis had introduced too many new ideas. A culture which had once been static

had become dynamic simply because it had been overburdened with new ideas and concepts.

It wasn't catastrophes that had ruined Nidor—not even the Great Cataclysm had done that. It had been *ideas*—devastatingly new ideas—that had done the terrible, irreparable damage to a culture which had sustained itself intact for thousands and thousands of years.

For a decade and a half, Norvis had hated the Earthmen for what they had done. Then, when Smith had explained, he had thought that they were doing it—*bad* done it—for the good of Nidor, and he had felt relief.

But now he knew that the Earthmen had done nothing directly. They had simply bred—yes, *bred!*—a Nidorian who would do their work for them. And he had. As they had known he would.

He didn't know, at that point, whether he hated Smith or worshiped him—or, perhaps, feared him.

He decided it must be hatred, but it wouldn't do him any good to hate Earthmen. He was helpless, as they had known he would be. He had to rebuild Nidor—rebuild it along the lines they wanted. Why? Because he was built that way; he could do nothing else. He couldn't stand around and watch his home, his people, dissolve into barbarism.

He was irrevocably dedicated to the course ahead of him.

Damn them, he thought. *Damn them!* And then, after a moment: *Bless their damned souls!*

It was the night of the second day when he arrived in Holy Gelusar. The Great City looked oddly unimportant now, no longer the metropolis he had once thought it to be. He trotted across the Bridge of Gon and headed toward the Great Temple.

No sooner did he approach the charred building when a guard rushed up. "Secretary Norvis! Where have you been? We've looked all over Nidor for you!"

"What's happened?" Norvis asked. It was near morning, and he was tired.

"Leader Kris has been shot!"

"Take me to him!" Norvis said. He dismounted and the guard led him up the stairs to the room where Kris lay. His fingers quivered a little as he threw open the door.

Marja was standing at the foot of the bed, and Ganz by the Leader's side. Two other men that Norvis recognized as physicians stood by helplessly.

Norvis glanced at one of them. "How's his condition?"

"Serious," the physician said bleakly. He lowered his voice. "We don't have much hope."

Kris, Norvis thought sadly. You were almost a son to me—and here you are, dying of the bullet I should have gotten.

He took Kris' cool, limp hand. The Leader opened his eyes slowly and focused them on Norvis.

"I heard what that doctor said," he muttered indistinctly. "Not much

hope. You don't have to hide it from me."

"Easy, Kris," Norvis said. "Don't talk."

"Doesn't matter. I'm going, maybe it's best this way—cut off at the top. Wealthy, good wife, everyone cheering. Earthmen gone. Nidor rebuilding. I might have lived to see worse." His head sank back. "You've been good to me, Norvis. Thanks."

Kris shuddered, and Norvis squeezed his hand and let it drop. "He's dead," Norvis said. There was little emotion apparent in his voice.

"He was a great man," Ganz peDel said. Behind him, Marja sobbed quietly.

Norvis took a deep breath and steeled himself for what had to be done. He rose from the bedside, walked toward Ganz peDel, put his arm around the boy's broad shoulders.

"Nidor needs a new Leader," he said quietly.

"But I'm . . . you . . . I—"

Norvis smiled. "Kris thought you could do the job, Ganz peDel. Do you?"

"I . . . I think so," Ganz said, after a pause.

"Good. We've got plenty of work ahead of us, then." Norvis walked to the window of the death-room and threw open the shutters. The Great Light had just risen, and the light of dawn came streaming in, breaking through the eternal clouds of Nidor.



THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

EVERY MAN AN ISLAND

"No man is an Island," John Donne wrote—and if there has been a unanimity in the "teaching" of modern science fiction, from the religious fantasy of C. S. Lewis to the unabashed space opera of Edmond Hamilton and E. E. Smith, it is on this tenet. All men are one. All thinking creatures are one: "pieces of the maine," to continue Donne's simile.

Yet all of us have felt the rise and fall of the tides that carve away at the shoreline of society, gnawing a cape into a peninsula, eroding the

peninsula into an island, and finally drowning the island to a shoal or reef on which some other one's pride will run aground. Writing in the November *Art News*, Harold Rosenberg makes clear how this insularity grows in a culture like ours. What he says of art is as true of science—or science fiction.

Rosenberg is talking about the difficulty of defining the audience for whom an artist paints, for whom a novelist writes. And the thing, he says, which distinguishes our time from much of the past, is that there is no longer any *one* audience: we are, instead, fragmented and insu-

ASTOUNDING SCIENCE FICTION

lated into innumerable special audiences, each with its own interests, its own point of view, its own language. "And in the sense that they are literate, selective and self-conscious in their tastes, all audiences are audiences of intellectuals," Rosenberg says. "Science-fiction pulp, tabloid sports columns, rock'n'roll gossip, the New Criticism, assume various levels of technical preparation and familiarity with terminology on the part of their readers. . . . Such an audience differs from that of a Museum of Modern Art first-night less in intellectual capacity and educational background than in the form of its interests and their social expression, which are the effects of chance, environment and publicity. Moreover, American audiences interlock and their components pass over from one to the other."

What better support for this point of view can you find than a science-fiction convention, where scientists, editors, writers, teachers, typists, mechanics, salesmen, even professional critics come together in the name of a common interest—then scatter, only to find each other again in a different grouping: in a model telescope club, at the opera, at a sports-car meet, or just bowling?

"Everyman a Professional" is what Rosenberg has called his article. What he means is that to a great extent the "profession" of art is isolating itself from music and literature and science, and they from it. The whole populace is dividing itself into cells of professionals and

semiprofessionals, dedicated to their special interests. A continual, yeasty ferment and turbulence goes on all the time, it is true, kneading former fragments together into new groupings, bringing some up into prominence and submerging others. But as the professionalism develops, the walls between the cells become tougher and harder to break through. How long will it be before it is impossible for a neo-fan to break into a science-fiction convention?

Let's look at some of the other stigmata of this form of professionalism. Remember, the author is speaking primarily of art: I am the one who is asking whether what he says doesn't fit science fiction just as well.

Complication of techniques: and what do we do, nowadays, to the poor, lorn soul who admits that he likes Edgar Rice Burroughs and can't understand Van Vogt or stomach Bradbury or enjoy the documentary realism of Clarke?

Self-consciousness: and who will deny that we are every bit as self-conscious as chemists or Veterans of Foreign Wars or Rotarians or Elks?

Evolution of a unique language: and how often do we hear bitter complaints from the newcomers, and from general readers who have wandered into science fiction, that they simply don't know what the words mean—and they can't find out by looking in a scientific handbook or a technical dictionary? "The more incomprehensible this lingo is to

outsiders, the more thoroughly it identifies the profession as such and elevates it out of the reach of mere amateurs and craftsmen."

We are by no means alone in this, and we have assimilated, as it were, some of the jargonistic tendencies of the sciences with which we are concerned. I was trained in chemistry and physics, so that I can still understand some of the more elementary language, but I get lost in biology and more than lost in medicine. I was connected with professional education long enough to watch the educators (cf. the "morticians," the "beauticians," the "sanitary engineers") picking up jargon from psychology — then warping their own meanings on technical terms that had entirely different significance outside the educational profession. What price, should I say, "Null A"?

There is another mark of the profession which seems to be upon us: guerilla warfare with other professions for status, cash rewards, and the satisfaction of our vanity. *We* are the important ones; fantasy is trash; science fiction is the literature of the future, the liberator of artistic integrity, the only form of writing where there is still room to experiment. . . .

Guilty? I think we are—and if you accept Rosenberg's argument that this is something that is happening within our society, there is nothing much we can do about it without changing society. But is this necessarily unhealthy? I don't think

Harold Rosenberg considers it necessarily so.

Mathematics could never have advanced as it has without the completely self-centered, esoteric jargon of equations and symbolic operations, most of which mean nothing and can never mean anything except to other mathematicians. Chemistry could never have become what it is without the periodic table, without atomic theory, without energy relations and a host of other considerations that didn't even exist when I was in college.

There is another nice analogy in evolution and anthropology. Races and cultures develop individuality when they are isolated and inbred, able to advance only with whatever possibilities are inherent within themselves. Then, when these differentiated and "professionalized" species or societies break over the boundaries and impinge on each other, the cross-fertilization is tremendous.

So let's accept Rosenberg's evidence and admit that science fiction has made itself a profession—an island in the archipelago we call literature. Let's quit pretending that we are the whole land-mass, or the biggest, or the only important one and concentrate on our own potentialities. Let's not be too perturbed when our own island, small as it is, shows signs of breaking up still further. After all, John Campbell has been and is quite happy to have Astounding develop the distinct characteristics we all recognize. Hor-

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ace Gold feels the same way about *Galaxy*, and Tony Boucher about *Fantasy and Science Fiction*. Other magazines in the field are becoming professionalized in the same way: there is no such thing as a *general* science-fiction magazine, any more than there is a general fiction magazine, or a general magazine. (Only this week we've seen one of those—*Colliers*—die.)

And while I'm at it, let me carry this wild potpourri of similes and analogies one dogged step further. Coastlines grow at the same time that they're being worn away. The present continents, I gather, are thought to have enlarged themselves from former groups of islands. On a universal scale, the vast cosmos of gas and dust has condensed into stars and galaxies which regroup into new super-assemblages and set about dissipating into gas and radiation. By the same token, science fiction will eventually, I'm sure, become part of some new continent of literature, with the stable mass-audience that you can get in a static society of fixed and generally accepted values. The islands will be cemented together again into something quite unrecognizable to us today. And then the new jargons will begin to form, the new professional islands to separate.

In the H-bomb, and all that it promises for Mankind's eventual escape from dependence on the Sun for energy, fission has to provide the impetus that makes fusion possible. Maybe that's what is happen-

ing in science fiction, and in all the arts and sciences in our time.

TARNISHED UTOPIA, by Malcolm Jameson. *Galaxy* Novels, New York. 1956. 35¢

Galaxy's series of paper-covered novels, of which this is No. 27, has included some real classics and picked up some good originals—most notably the first appearance, this side of the Atlantic, of Clarke's "Prelude to Space." This thud-and-blunder opus, vintage 1941, seems even older and sets an all-time low for the series. It's the one in which a man and girl from the present sleep for a thousand years or so, and emerge to become slaves in a future oligarchy. Of course, after all sorts of brutality, they lead a successful revolt against the Masters . . .

"SCIENTIFIC AMERICAN" BOOKS

THE NEW ASTRONOMY

ATOMIC POWER

AUTOMATIC CONTROL

A 20TH CENTURY BESTIARY

THE PHYSICS AND CHEMISTRY OF LIFE. Simon and Schuster, New York. 1955. 150-270 pp. \$1.00 each

I passed over these paper-backed collections of articles from *Scientific American* when they first came out, because I thought that the big "Scientific American Treasury" had simply been cut up into its parts. This

isn't the case, although all the chapters have appeared in the magazine and many of them were in the "Treasury." Since publication, what was originally called "First Book of Animals" has been changed to "Bestiary," presumably to avoid confusion with a book for children.

Since it's so late, I'll merely say that if you don't read *Scientific American* regularly, and if you do want clear, authoritative, popular articles on present-day scientific achievement and thinking, you should take a look at these p-b's. What you won't find, for some reason, is anything on the continuous-creation view of the universe of which Fred Hoyle is the chief defender: the editors have plugged for Gamow's "ylem" or cosmic atom theory, although Hoyle does get a chance to mention his theory in a chapter on the creation of heavy elements in the ultrahot stars. There are doubtless other holes of the same kind: I missed any of the excellent archaeological and anthropological articles, which do for the story of Man on Earth what the present books do for the physical and biological sciences.

You'll discover that these articles open up all sorts of fascinating vistas. Don't overlook them, or the magazine from which they come. Since 1948, when it completely transformed its policy and format, *Scientific American* has been the magazine for the non-specialist in

science, and has dealt with many subjects on a level that specialists from outside fields have found helpful.

ONE AGAINST THE MOON, by Donald A. Wollheim. World Publishing Co., Cleveland. 1956. 220 pp. \$2.75

This teen-age book is on about the level of the Winston series, and 'way below Andre Norton's various anthologies for World.

The book is a Moon yarn of the pre-realistic school, which owes more to Wells' "First Men in the Moon" than to John Campbell's "The Moon is Hell" or Lester del Rey's stories for Winston. Its Moon is a complex of rock-walled bubbles with their own flora and fauna, air and water, inhabited by translucent animals and men. Robin Carew, stowaway on a test rocket, lands with a crew of rabbits and monkeys and crashes into one such bubble, which miraculously seals itself off again. He fits himself into the lunar ecology, makes friends with a native boy, discovers that a Russian rocket has also landed—with his lost brother in the crew!—and tangles with a mad scientist. All old stuff, all formula, but graphically presented in the Wollheim manner. It may help bridge the gap between TV and Hollywood and the good juvenile SF that's on the market.

THE END



BRASS TACKS

Dear Mr. Campbell:

Here is my ballot for the Analytical Laboratory on the November issue of *Astounding*.

1. "Sourdough," the short story by Robert Silverberg. I happen to be quite interested in psi phenomena, and am therefore somewhat biased toward stories dealing with this subject. Nevertheless, I think that the story has several other merits. It handles the subject clearly and is well-written. It makes sense. (It expresses several of the arguments I have been using to try to convince my friends of the importance of ESP. My mother, a Philosophy teacher, wonders why we have very little record of psi being heard of through history. If this is something that we all possess latently, why hasn't it come to our attention before.) The story does not use some mysterious gimmick to reach its conclusions.

2. "The Naked Sun" II, by Isaac Asimov. Asimov has blended the detective mystery and the robot science fiction story quite smoothly. I remain in suspense as to the solution.

3. "With All the Trappings," by Randall Garrett. This is a well-planned story, and it ranks up with #1 and #2. The ending was especially neatly managed.

4. "Sour Note on Palayata," by James H. Schmitz. This story would have ranked higher, in my opinion, if some of the rather pointless passages were straightened out. I can find no justification for the story in the first reading. (After all, Science Fiction has advanced to a stage where every story should have some definite point.)

5. "The Doorstop," by R. Bret-nor. Here again the main fact in the story—what holds it together—is not out in the open where I can find it.

If you counted the articles, I would have to vote "The Troublesome Dimensions," by Poul Anderson, a solid first place! If you keep printing such interesting and informative articles as this one and "Island in the Sky," you will find readers wanting more than one article per issue. By the way, several of the teachers in the Biology Department at my school are pondering the "Pate de Foie Gras," by Asimov in the September issue of ASF.—Roland Hirsch.

You might answer your mother's objection on the psi phenomena business by pointing out that history is, actually, full of accounts of psi phenomena—but confused and distorted due to inadequacy of the language available. The old records are full of the phenomena, though; they called it "magic." The confusion results from the fact that some of what was lumped under the term "magic" we now understand fully, and call "science"; items like walking on water, levitation, precognition, and mind-reading, however, aren't includable under science.

Dear Mr. Campbell:

Years ago, my sister and I read Huxley's "Eyeless in Gaza." She said it twisted her insides, I laughed at it and thought myself insensitive. But since then, there have been stories that touched me as that one did her.

Algis Budrys' "Death March" is one of these.—Mary Dziechowski.

A story hits hardest when the problem is one close to home.

Dear Mr. Campbell:

Concerning that sixty-mile-per-hour bullet, and the supply rocket with the enormous store of kinetic energy which will tear the space station limb from hub—either Mr. Plummer has his tongue firmly lodged in check, or he is a fine example of the old axiom about a little knowledge. Assuming the latter case, here is a rudimentary lesson in the physics of work and energy.

Let me preface this with the statement that the following material is entirely unrelativistic—that is, the velocities concerned are far enough below that of light as to keep out of the field of Einsteinian physics.

To begin with, we can state simply that most practicing engineers and physicists think intuitively about work and energy relationships. In a closed system the energy change resulting from a velocity change is proportional to the *change* in velocity squared. If you use the velocity difference you will always have the correct answer, regardless of the absolute velocity as viewed from outside the system.

Now for those who are unwilling to take my word unsupported, let's

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be rigorous. Going back to Newton we have, by definition

$$F = Ma$$

where F is the resultant force acting on the body, M is the mass in slugs, and a the acceleration in feet per second per second. Acceleration can also be expressed as

$$a = v \frac{dv}{ds}$$

Substituting $F = Mv \frac{dv}{ds}$

$$\int Fds = \int Mvdv$$

If we integrate this expression between limits v_1 and v_2

$$\int Fds = \frac{mv_2^2}{2} - \frac{mv_1^2}{2}$$

in which the term $\int Fds$ expresses the *work* done to change the kinetic energy from condition 1 to condition 2. Note that the integral of this term is simply Fs , if we have a simple case.

Now, the crux of the problem—where is the observer? If he is one of the station crew he is convinced that he is standing still, and the rocket approaches at one fps. Now—and here, too, Mr. Plummer is a little off base—if the rocket weighs 66.4 tons earthweight its mass is 4130 slugs. The kinetic energy equation calls for mass, and the units must be consistent. At a velocity of 1 fps the rocket will have a KE of 2065 foot pounds, to the observer on the station. Let's say, for con-

venience, that it takes the shock absorbers one second to bring the rocket to rest relative to the station, and that they are built to develop a constant force as they are deflected. The rocket's acceleration will then be determined by the relationship $v = at$, where t is time in seconds, and therefore the acceleration will be one foot per second per second. The distance the rocket will travel while stopping is at $2/2$, or one half foot. Going back to the expression for work and substituting, the force exerted by rocket on station—or vice versa, they're equal—is 4130 pounds.

Now let's take the same case as it appears to the observer on earth. Allow me to modify the velocities in the interest of simple arithmetic to 20,000 fps and 20,001 fps. The rocket mass remains 4130 slugs. Squaring the velocities and multiplying these frightful large numbers we come to a total KE of 82,620,000 foot pounds, due to the change in velocity. But slowing the rocket is *work*, in the physical definition of the word, and work is force times distance, or Fs . The time for acceleration remains one second, but in that second rocket and space station travel 20,000 feet. Dividing that stupendous KE by 20,000 results in a total force of—voila!—4130 pounds. And *force* is what determines the stresses in materials, and their failures when overloaded.

And one parting shot. What is the real velocity of that bullet? Depends on where you stand. To observers

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on Mars, or the Sun, or on Alpha Centauri, there would be all kinds of velocities. But who cares? To the observer in the system we select, the velocity is important. To any other, it's a matter of academic interest. As long as the energy is conserved, and believe me, it is.—Henry Cohan, 3504 Carlsbad Way, Riverside, California.

That is a neat and valid explanation of the Force problem. Now let's see you solve the energy problem—which can't be handled on so simple a basis, since energy is a quadratic, not a linear, function!

You may have noticed that jet engines, as well as rockets, are rated in terms of thrust force; try rating such devices in terms of fuel-energy efficiency; what percentage of the chemical energy available in the fuel consumed is converted to kinetic energy? That is not a linear function, and apparently the "principle of parity" doesn't hold there, either!

Dear Mr. Campbell:

On page 57 of the February 1957 issue of Astounding you have perpetrated a truly ASTOUNDINGLY illiterate error. The passage in question is as follows: "That comes as close to a physical demonstration of the old Biblical phrase 'Full of sound and fury, signifying nothing,' as anything I know of."

Aside from reading your Bible more frequently, may I suggest that

you read the fifth speech in Act V, scene 5 of the play "Macbeth," which, you may recall, is by William Shakespeare. The speech is the one which begins, "She should have died hereafter." You probably are thinking I should also, but that is how these things are.

Incidentally, I read your magazine religiously every month, so I feel that I have a right to carp and criticize when you pull something like this.—Wayne C. Shroll, 4125 Brooklyn Avenue, Seattle 5, Washington.

I had the item confused with the Biblical passage of similar concept concerning sounding brass and tinkling cymbals.

Dear Sir:

"Witches Must Burn" is of absorbing interest, for this reason. Put the story in a European setting and it would be seen at once that it is completely impossible in any conceivable future. But in an American setting it seems weirdly credible. Moreover it fits in with the report on America given by that highly intuitive genius D. H. Lawrence and the prophecies of that most intuitive of American poets Robinson Jeffers. Fitted together, the reports come to this:

Scientific technology with the political structure of the United States, are essentially European things and with each generation they become more alien to the soul of America. This is shown by the general dislike

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of "Eggheads" or intellectuals and the contempt felt by Americans for politicians. "Science" and "Democracy" are things of Europe, and however much lip-service Americans may give to them, in their hearts they hate them. They pay lip-service to Science and call its practitioners Eggheads, a term of abuse unthinkable in Europe. (In England the milder denigrative word "highbrow" has become a term of grudging respect. It means you would like to be highbrow but just can't manage it.) They pay lip-service to Democracy and regard those who work the political machine with the utmost contempt. This shows a split mind. It shows that in America the entire cultural tradition, including of course Science, and the State itself, have become idols which the populace are at present forced to worship but will smash at the first opportunity. E. G. Gunn in the story shows a high school boy running to shoot an Intellectual. A European could not even imagine the incident, but Gunn can visualize it.

Senator Bartlett in the story calls Science an un-American activity, and he is perfectly right. It is a European activity. The Eggheads are attacked and their universities burnt because they are the last representatives of the European tradition, now quite alien. The last Tories. It is the completion of the American Revolution.—W. P. Witcutt, 9 Navarre Road, East Ham E6, England.

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(Continued from page 7)

workshops and high-school labs. A motor-driven rotary switch, a battery, a resistor, a thermocouple or calorimeter system, and a standard vacuum tube voltmeter do fine. A buzzer can replace the motor-driven rotary switch, of course.

The experiment proceeds as follows: adjust the switch so that it is closed fifty per cent of the time, and open fifty per cent of the time. Apply the battery voltage through the switch to the resistor. Measure the voltage across the resistor with the VTVM, while measuring the power dissipated in the resistor by the heat-energy output.

Let's say the battery voltage is 10 volts. Now the standard type of vacuum tube voltmeter can be calibrated on 60-cycle AC, and is then supposed to be useful on other frequencies over a wide range. Of course, the standard calibration is RMS, or Root Mean Square calibration, although the usual VTVM uses a diode rectifier type of peak-reading instrument. By testing the calibration of our VTVM on a standard 60-cycle source, we find it is reading 10 volts RMS when the regular AC voltmeter reads 10 volts, so the calibration is good.

We now hitch it to the output of the rotary switch; it reads 3.5 volts. A standard DC voltmeter-hitched to the same place reads 5.0 volts. Oh, well—that's because this is a square wave, and the Root Mean Square calibration isn't quite appropriate; we have to multiply the RMS read-

ing by 1.41 (the square root of 2) to get the correct peak voltage reading, so that gives us 5.0 volts, in agreement with the DC voltmeter.

Funny, though . . . the battery voltage is 10 volts . . . ?

Oh . . . it's the interruptions caused by the rotary switch being closed only fifty per cent of the time!

Let's adjust the switch so it's closed only ten per cent of the time, and is open ninety per cent of the time. The thermocouple reading starts dropping, and soon shows markedly less power in the resistor. But the VTVM now reads 6.3 volts! It's gone *up*, while the power has gone *down*!

And this proves that the higher the voltage, the less the power.

The above statements are perfectly correct; I can demonstrate them, and you can check the experiment yourself. You can't argue with facts, and those are demonstrable, repeatable facts.

The DC meter, it is true, reads lower when we have the switch set to ten per cent closed, ninety per cent open, but further checking of the DC meter shows it is no good anyway. When put on the known 10 volt source, where the VTVM and the standard line meter both read 10 volts, it reads zero. The standard line meter, incidentally, is a simple iron-vane type, and reads 10 volts on the battery and on the AC line, while the DC meter proves quite unreliable by disagreeing with

all the other meters in a highly variable way.

On the battery, it agrees with the iron-vane standard line meter. On the AC line, it reads 0 while the standard line meter reads 10, as does the VTVM.

But there's some doubt here, which doubt can be resolved into complete confusion if we introduce another vacuum tube voltmeter of the type of the RCA Voltomyst Senior, a peak-to-peak type. On the AC line, where the standard line meter reads 10, the original VTVM reads 10, and the DC meter reads zero, the new VTVM reads 28.3 volts.

Look . . . will somebody tell me what a volt is?

The Voltomyst Senior is a peak-to-peak reading instrument; it uses a clamp-tube circuit that establishes a zero-voltage reference point at the most-negative-peak-value, and then measures the difference between that and the most-positive-peak value. For a sine wave having a root mean square value of 10 volts, the peak voltage is 14.14; the peak-positive to peak-negative voltage is twice that, of course, of 28.28.

The usual AC line voltmeter is the "iron-vane movement" type. They depend on the magnetic field produced by an electric current, and work just as well on DC as on AC . . . provided the AC frequency is low enough so the coil doesn't have too much impedance.

That pulsating DC current out of the rotary switch just happens to be

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something none of the voltmeters of the usual types is designed to read; the Voltomyst Senior peak-to-peak type is designed to read pulse-wave voltages. Of course, it will merrily say "10 volts" on that DC pulsating wave, whether there's 50% ON or only 0.1% ON—which would allow me to demonstrate, by actual measurement, that voltage had nothing whatever to do with variations in power dissipated in a resistor.

But let's use AC power in the resistor, and measure it with the DC meter. It can now be shown that, again, voltage has nothing whatever to do with power, because the DC voltmeter continues to read zero, while the smoke comes pouring out.

Now anybody who's studied arithmetic knows that $1,000,000 - 1,000,000 = 1 - 1$, that there's no difference between the two. That's what the DC voltmeter is saying; a sine wave of any frequency, and of any amplitude, integrates to zero—the plus and minus waves cancel, and that means it's nothing, really.

And I can prove that's true, by measuring it with accurately calibrated instruments, too.

No wonder Edison said that AC was unmanageable, ununderstandable, and unusable, and insisted on DC power systems!

We can have a lot more fun with this business of "But . . . I *measured* it!" Nobody ever measures *it*; they measure a theory. Every meter is an encoding device; if the coding system is appropriate to the infor-

mation-system under study, then there is a predictable correlation between the meter reading and the situation. If the encoding system happens to be inappropriate to the problem. . . .

Let's use any of the standard integrating voltmeters on the power supply to a radar magnetron transmitter-tube, for instance. It reads 1.0 volts, we find. This is a correct average-integrated reading, since the actual situation is that the power supply is delivering 10,000 volts for one microsecond 100 times a second. If we used some sort of statistical sampling system, we would have 0.01 chance in 100 of finding *any* voltage present!

Evidently, the presence of voltage in this system is a statistical anomaly, and of no significance.

Yes, and practically speaking, there is nothing present in a stone wall. That fact can be demonstrated by neutrinos, and by broadcast radio waves, as well as by statistical consideration of the probability of finding anything at randomly designated geometrical points. On the basis of measurements made by radio penetration and neutrino flight, plus good statistical analysis, the stone wall isn't present save as a minor statistical anomaly.

Unfortunately, you're not a statistical analysis; don't try driving through it. The bomber pilot can also report that the "not really there at all" statistical anomaly of radar doesn't conform to the statistician's predictions.

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By the way, you know that old saw about there being "a finite, however small, probability that all the molecules in your room might gather in one corner of the room"? That's a mathematician's nonsense; the mathematical statistician uses the Gaussian Curve concept, the dearly-beloved "bell-shaped curve" that tails off to infinity at each side. Like many another mathematical device, it works just fine for mathematicians, but won't work for anything else. That old saw is a liar; there is absolutely *zero* probability that the molecules will gather in one corner of any volume, at any time. And I mean *zero*; it isn't a "finite probability however small," it's flatly zero. It's impossible. Proof: The molecules would have to violate the law of conservation of momentum to do it. They might, maybe, gather in *three* clumps, but there is absolutely zero probability of gathering in one.

Here's another instance of using the wrong instrument; a Gaussian Curve probability concept doesn't fit any real-world situation I know of much better than the RMS calibrated voltmeter fitted the pulsating

DC square wave. It operates on an inherently inapplicable theoretical analysis. Mathematically, it's fine; in reality, it won't fit anything. Mathematically, it's meaningful to ask "How large a population would be needed to produce a .9 probability of finding ten individuals over thirty feet tall?"

In the real-world problem, probability does *not* trail off to infinity; it reaches a limiting law, and stops dead.

When a man says "I measured it!" what does he mean, actually?

Darned if I know—and I'd like to very much. In particular, I'd like to know what "measuring" would mean as applied to an area where no theory yet exists! Imagine someone setting up a system consisting of an antenna, a curious sort of mouthpiece to be held between the teeth, and a ground wire connected to a metal plate. He says, "If you stand on this plate, and hold this mouthpiece between your teeth, you will hear mysterious crackling and rushing sounds."

Assume this is pre-radio, back



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around 1870, say. He claims it's due to some mysterious electrical phenomenon, and that the mouthpiece—which he shaped from a broken hunk of mineral called galena—is necessary for unknown reasons.

It can be shown that there is no electricity in the system; a galvanometer connected between antenna-mouthpiece and ground-plate indicates none. Also, for some mysterious reason, not everyone gets any effect, and those who do get it get it only irregularly.

It'd take quite a while, I imagine, for people to learn that galena could serve as a crystal-detector rectifier at radio-frequencies, and, if you have metallic fillings in your teeth to contact the galena, and the natural static level happens to be high enough, you definitely will "hear" rushing and crackling noises, by direct electrical stimulation of the nerves.

How can you "measure" something without a theory of encoding?

So darned many phenomena—many of them still unrecognized—have been evolved into our organisms by three billion years of trial and error that our organisms will, frequently, respond to a fact we don't yet consciously know about. But we can't "measure" it until we do get a conscious theory.

And then, of course, the theory is usually wrong the first guess.

What do you mean by "measure"? Someone tell me what a volt is, huh?

THE EDITOR.

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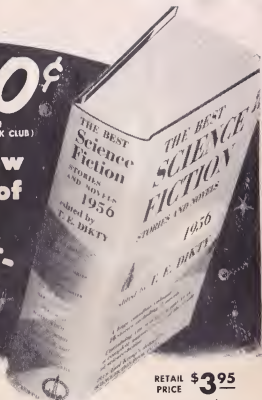
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